

JVC AV-48P777/H SERVICE MANUAL



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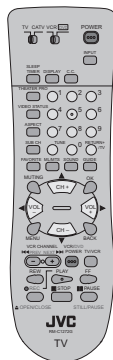
SERVICE MANUAL

REAR PROJECTION TELEVISION

**AV-48P777_{/H}, AV-48P787_{/H},
AV-56P777_{/H}, AV-56P787_{/H}**

BASIC CHASSIS

SR2



I'ArtTM *PRO*

HIGH DEFINITION TELEVISION
HDTV
MONITOR

HDMI
HIGH-DEFINITION MULTIMEDIA INTERFACE



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SPECIFICATION

Items		Contents	
		AV-48P777 AV-48P787	AV-56P777 AV-56P787
Dimensions (W × H × D)		120.0cm × 118.9cm × 62.2cm (47-1/4" × 46-7/8" × 24-1/2")	136.8cm × 138.6cm × 66.7cm (53-7/8" × 54-5/8" × 26-3/8")
Mass		76.9kg (170 lds)	83.3kg (184 lds)
TV RF System (Analog / Digital)		Analog : CCIR (M) Digital : ATSC terrestrial / Digital cable	
Color System (Analog)		NTSC	
Sound System (Analog)		BTSC system (Multi Channel Sound)	
Teletext System (Analog)		Closed caption (T1-T4 / CC1-CC4)	
Receiving Channels and Frequency (Analog)	VHF Low VHF High UHF	02ch~06ch : 54MHz~88MHz 07ch~13ch : 174MHz~216MHz 14ch~69ch : 470MHz~806MHz	
	CATV	54MHz~864MHz Low Band : 02~06 High Band : 07~13 Mid Band : 14~22 Super Band : 23~36 Hyper Band : 37~64 Ultra Band : 65~94, 100~135 Sub Mid Band : 01, 96~99	
TV / CATV Total Channel		191 Channels	
Intermediate Frequency (Analog)	Video IF Sound IF	45.75MHz 41.25MHz (4.5MHz)	
Color Sub Carrier (Analog)		3.58MHz	
Power Input		AC 120V, 60Hz	
Power Consumption		240W (Max)	
Screen		Transparent screen (unitized fresnel lens / double lenticular lens)	
Screen Size		48" (122cm) Measured diagonally (W:106.3 cm, H:59.8 cm), 16:9 ratio	56" (142cm) Measured diagonally (W:124 cm, H:69.8 cm), 16:9 ratio
Projection Tube		17cm (6.7") tube × 3 (R/G/B)	
High Voltage		31.6kV [+1.0kV / -1.5kV] (at zero beam current)	
Speaker		13cm round type × 2	
Audio Power Output		7W+7W (Full range)	
Antenna Terminal (VHF/UHF, ATSC / DIGITAL CABLE IN)		75Ω unbalanced, coaxial, F-type connector × 1	
Video / Audio Input [INPUT-1/2/3/4]	Component Video [INPUT-1/2] 1125i / 750p	RCA pin jack × 6 Y : 1V (p-p) (Sync signal: 0.35V(p-p), 3-value sync.), 75 Ω Pb/Pr : ±0.35V(p-p), 75 Ω	
	525p / 525i	Y : 1V (p-p), positive (Negative sync provided), 75 Ω Pb/Pr : 0.7V(p-p), 75 Ω	
	S-Video [INPUT-1/3/4]	Mini-DIN 4 pin × 3 Y: 1V (p-p), positive (Negative sync provided), 75 Ω C: 0.286V (p-p) (Burst signal), 75 Ω	
	Video Audio	1V (p-p), positive (Negative sync provided), 75 Ω, RCA pin jack × 4 500mV (rms), high impedance, RCA pin jack × 8	
Digital Input	Video	HDMI 2-row 19pin connector × 2 (Digital-input terminal is not compatible with picture signals of personal computer)	
	Audio	Digital: HDMI 2-row 19pin connector × 2 Analog: 500mV(rms) (-4dBs), high impedance, RCA pin jack × 2	
Audio Output (FIX)		500mV(rms) (-4dBs), low impedance (1kHz when modulated 100%), (RCA pin jack × 2)	
Digital Audio Optical Output		Digital SPDIF × 1	
Remote Control Unit		RM-C1272G (AA/R6/UM-3 battery × 2)	

Design & specifications are subject to change without notice.

SECTION 1 PRECAUTION

1.1 SAFETY PRECAUTIONS

- (1) The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
- (2) Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
- (3) Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (Δ) on the parts list in Service manual.** The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.
- (4) **Use isolation transformer when hot chassis.**
The chassis and any sub-chassis contained in some products are connected to one side of the AC power line. An isolation transformer of adequate capacity should be inserted between the product and the AC power supply point while performing any service on some products when the HOT chassis is exposed.
- (5) **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.** Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : ($\perp$) side GND, the ISOLATED(NEUTRAL) : ($\equiv$) side GND and EARTH : ($\oplus$) side GND. Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure with a measuring apparatus (oscilloscope etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND at the same time.
If above note will not be kept, a fuse or any parts will be broken.
- (6) The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.
- (7) If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See ADJUSTMENT OF B1 POWER SUPPLY).
- (8) Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10k Ω 2W resistor to the anode button.
- (9) When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

(10) Isolation Check (Safety for Electrical Shock Hazard)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

a) Dielectric Strength Test

The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1100V AC (r.m.s.) for a period of one second.

(... Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.) This method of test requires test equipment not generally found in the service trade.

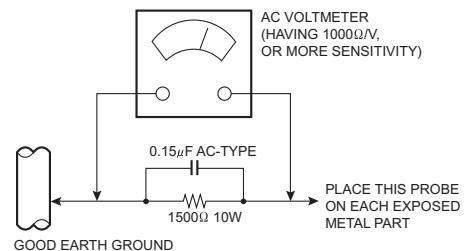
b) Leakage Current Check

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.). However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

• Alternate Check Method

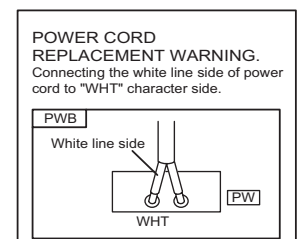
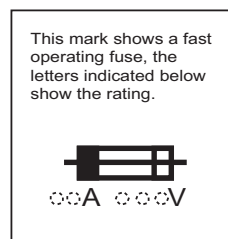
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000 Ω per volt or more sensitivity in the following manner. Connect a 1500 Ω 10W resistor paralleled by a 0.15 μ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).

However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



(11) High voltage hold down circuit check.

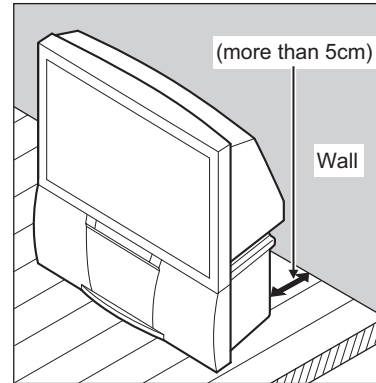
After repair of the high voltage hold down circuit, this circuit shall be checked to operate correctly. See item "How to check the high voltage hold down circuit".



1.2 INSTALLATION

1.2.1 INSTALLATION SITE

- (1) The rear of this set is provided with ventilation openings. Install the set more than 5 cm from a wall and in a location with good ventilation.
- (2) Avoid the following types of locations.
 - a) Unstable locations (location must be able to with stand heavy weight).
 - b) Locations subjected to direct sunlight.
 - c) Near stoves or other heating devices.
 - d) Locations subjected to humidity or oily smoke.
 - e) Dusty locations.
 - f) Locations with strong vibration.



VENTILATION OPENING

1.2.2 INSTALLATION ADJUSTMENT

When installing, moving or changing the orientation of the set, perform static convergence adjustment according to the following procedure.

Adjusting CRT color convergence have MANUAL and RESET. It adjust on the MENU screen.

NOTE :

Please you have TV on for at least 20 minutes before sing this feature.

This adjustment will be needed only when the colors of the characters/lines are separated and lack in distinction. If not, please don't perform the adjustment.

MANUAL

- (1) Press the [MENU] key, and select the "CONVERGENCE" in the Picture Adjust menu with [function up/down] key.
- (2) Press the [function left/right] key, the CONVERGENCE menu appears.
- (3) Press the [function up/down] key, and select the "MANUAL".
- (4) Press the [function left/right] key, then CONVERGENCE adjustment screen appear. [Fig.1]
 - If all the crosses are white, no convergence adjustment is needed.
- (5) Select the location you want to adjust by using the [number (2/4/5/6/8)] keys on the remote control unit. [Fig.2]
- (6) Press the [SLEEP TIMER] key to change the color of the box to the color of the cross you want to adjust (red or blue).
 - You cannot adjust the green cross.
- (7) Use the [function up/down] key and the [function left/right] keys to adjust the position of the cross.
- (8) Adjust the three colors crosses until they overlap and appear as a single white cross.
- (9) Press the [OK] key.

NOTE :

- When you adjust the convergence, make sure you start with the center position (position 5), and work your way around radial for best results.
- When you make the adjustment in the center (positions 5), you are making the adjustment for the whole screen. In other positions, you are making the adjustment only in that area.
- You can reset the adjustment if you do not like the results, See below.

- (10) Press the [menu] key to end the convergence adjustment procedure.

RESET

RESET in the CONVERGENCE menu resets all convergence adjustments to the factory default setting.

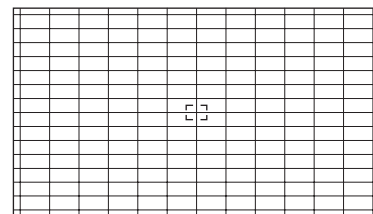


Fig.1

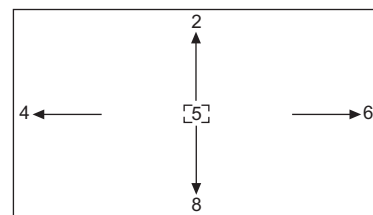


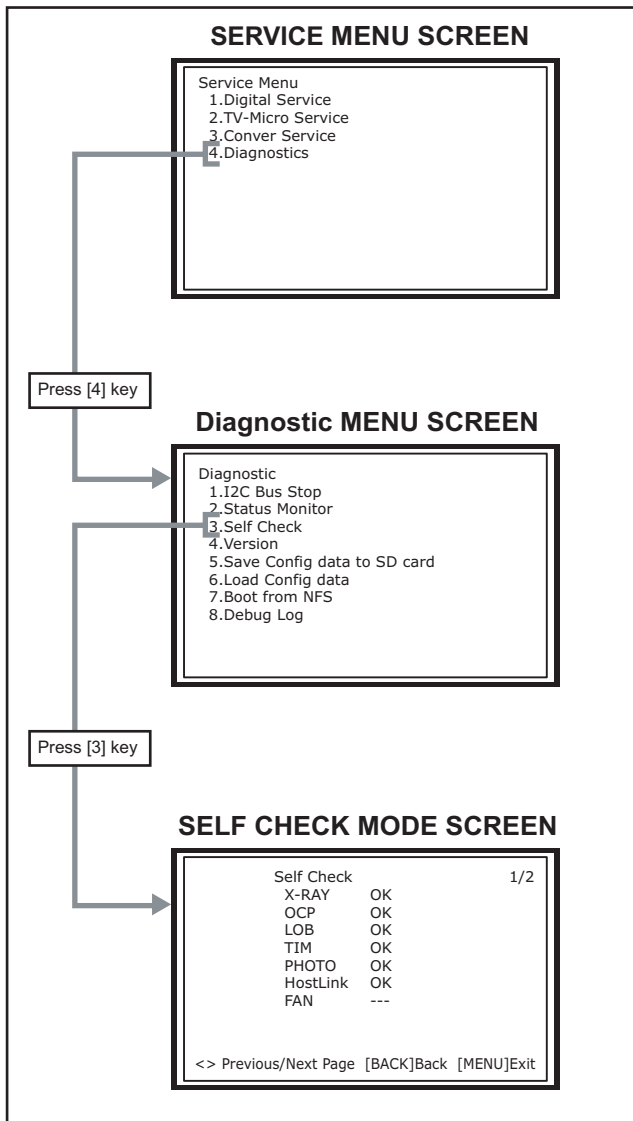
Fig.2

SECTION 2 SPECIFIC SERVICE INSTRUCTIONS

2.1 SYSTEM SETTING

Be sure to carry out the following operation at the end of the procedure.

- (1) Set to "0 minutes" using the **[SLEEP TIMER]** key.
- (2) While "0 minutes" is displayed, press the **[VIDEO STATUS]** key and **[DISPLAY]** key imultaneously, then enter the SERVICE MODE.
- (3) Press the **[4]** key (4.Diagnostics) in the SERVICE MENU SCREEN.
- (4) Press the **[3]** key (3.Self check) in the DIAGNOSTICS MODE screen.
- (5) The SELF CHECK MODE screen is displayed.
- (6) Turn off the power by pressing the **[POWER]** key on the remote control unit.



2.2 FEATURES

Built in ATSC (Advanced Television Systems Committee) TUNER

This TV can receive both Digital broadcasting (ATSC) and Analog broadcasting.

SMART CAPTION

Smart caption will appear when you press the MUTING button, only on channels where the broadcast contains CLOSED CAPTION information.

SMART SOUND

Decreases high sound levels, giving a regulated sound level.

DIGITAL COMB FILTER

By the 3D digital comb filter, the refreshed image can be seen.

VIDEO STATUS

Expression of a favorite screen can be chosen by the VIDEO STATUS function.

DIGITAL INPUT

Digital-in will display when any picture signal in Digital-in is displayed.

V-CHIP

Since the V-CHIP is built in, it can choose, view and listen to a healthy program.

MTS STEREO

The voice multiplex function of the MTS system is built in. (MTS = Multi channel Television Sound system)

NATURAL CINEMA

Watching the movie or animation, press the Natural Cinema to adjust the out line of the images to make thin more sharp.

VIDEO INPUT LABEL

This function is used to label video input connections for the onscreen displays.

A.H.S.

Adds a more spacious surround sound. Music gives basic effect and movie for more effect.

2.3 DIFFERENCE LIST

Item	AV-48P777/H	AV-48P787/H	AV-56P777/H	AV-56P787/H
BODY COLOR	SILVER	BLACK	SILVER	BLACK

2.4 TECHNICAL INFORMATION

2.4.1 MAIN MICRO COMPUTER (CPU) FUNCTION

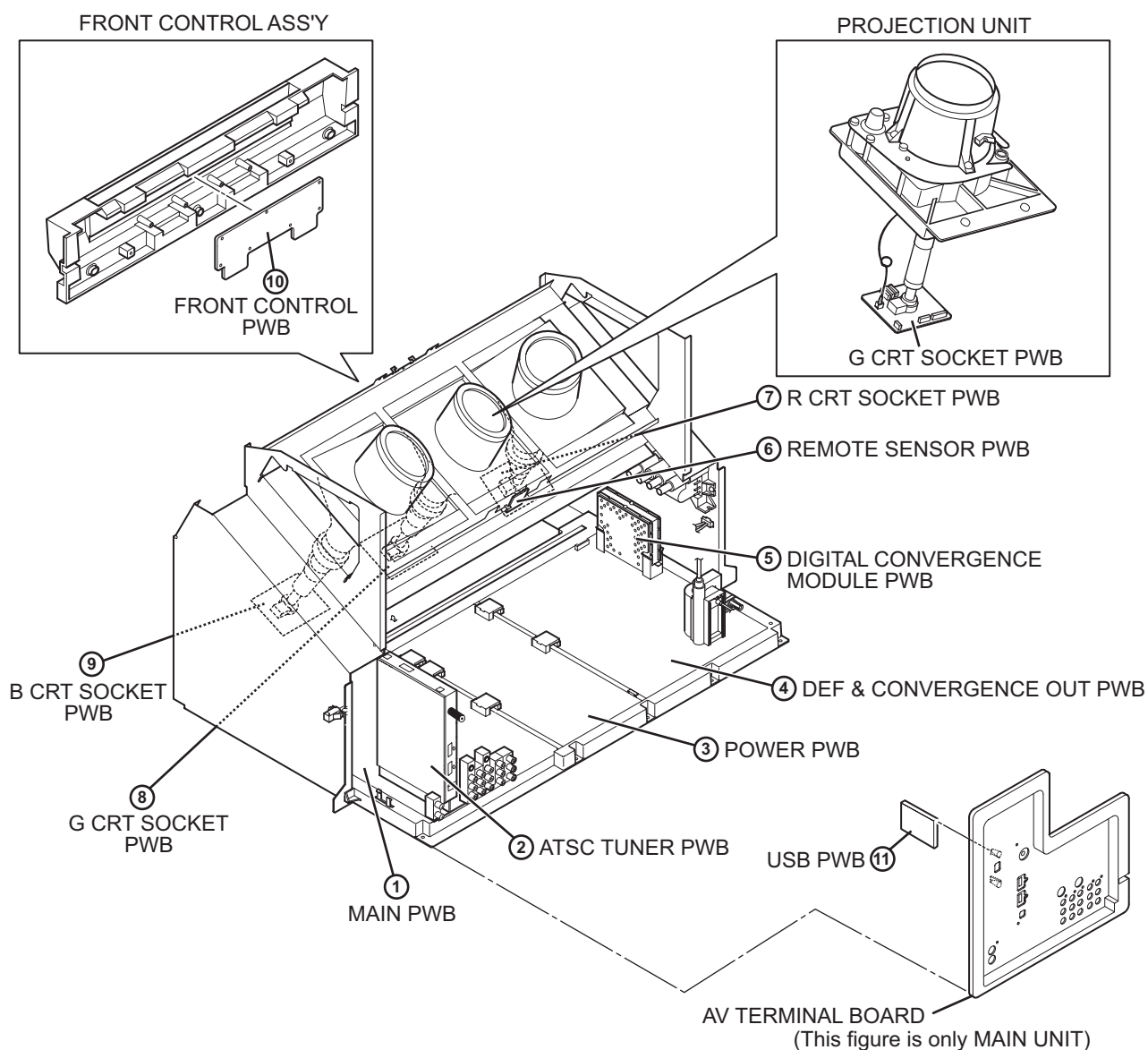
Pin No.	Pin name	I/O	Function	Pin No.	Pin name	I/O	Function
1	P60/SBT2	-	Not used	51	ATSC_TX	I	Serial communication for ATSC tuner
2	P_MU	O	Not used : Picture muting [Muting: H]	52	ATSC_RX	O	Serial communication for ATSC tuner
3	M_MUTE	O	Audio output muting [Muting: H]	53	P85	-	Not used
4	A_MUTE	O	Audio muting [Muting: H]	54	VREF+	I	Reference voltage [+3.3V Fixed]
5	ROTATION_L	O	Not used : Rotation control (left)	55	CONVER_TX	I	Serial communication for convergence control
6	ROTATION_R	O	Not used : Rotation control (right)	56	CONVER_RX	O	Serial communication for convergence control
7	P52/TM14OA	-	Not used	57	SDA0	I/O	I2C bus (data) for EEPROM
8	P53/TM14OB	-	Not used	58	SCL0	O	I2C bus (clock) for EEPROM
9	DEF_RESET	O	Not used : Reset for deflection	59	P92/TM10IOB	-	Not used
10	RD_RQ	I	DTV update	60	P93/TM10IOC	-	Not used
11	POW_LED	O	Lighting for Power/OnTimer LED [Power ON or TIMER ON: H]	61	AVSS	-	GND
12	DIMMER_LED	O	Brightness control for Power/OnTimer LED	62	DIGI_PHOT	I	Photo sensor for DIGITAL-IN illegal copy protection
13	P20/SBT2	O	Not used : Clock for ATSC tuner communication	63	P95/AN1	-	Not used
14	P21/SBI2	I	Not used : Data receive for ATSC tuner communication	64	P96/AN2	-	Not used
15	P22/SBO2	O	Not used : Data transmission for ATSC tuner communication	65	P97/AN3	-	Not used
16	P23	O	Not used : Data request for ATSC tuner communication	66	VDD	I	+3.3V
17	VDD	I	+3.3V	67	DIGI_PRO	O	Not used : HDMI control
18	FOSC	O	Not used	68	P71/SBI0	-	Not used
19	VSS	-	GND	69	P72/SBO0	-	Not used
20	XI	I	Not used : Low speed oscillator	70	P73	-	Not used
21	XO	O	Not used : Low speed oscillator	71	P74/SBI1	-	Not used
22	VDD	I	+3.3V	72	P75/SBO1	-	Not used
23	OSCI	I	Oscillation for system clock (16MHz)	73	SBD5	I/O	On-board writing for flash memory
24	OSCO	O	Oscillation for system clock (16MHz)	74	SBT5	I	On-board writing for flash memory
25	MODE	I	Single chip mode for CPU [H: Fixed]	75	NMI	I	+3.3V
26	TU_POWER	O	Not used : Power control for tuner	76	HDMI_CEC	O	Not used
27	P25	-	Not used	77	REMOCON	I	Remote control
28	TU_RESET	O	Reset for tuner [Reset: H]	78	V_SYNC	I	V. sync signal
29	PANORAMA	O	Not used : Panorama mode for deflection	79	IRQ3/PA3	-	Not used
30	P30/KI0	-	Not used	80	POWERGOOD	I	Not used : Power error detection [NG: H]
31	P31/KI1	-	Not used	81	PA5	-	Not used
32	P32/KI2	-	Not used	82	RST	I	CPU reset [Reset: L]
33	P33/KI3	-	Not used	83	VDD	I	+3.3V
34	AVDD	I	+3.3V	84	SCL1	O	I2C bus (clock) for RGB & DEF PROCESS (IC301)
35	P34/KI4	-	Not used	85	SDA1	I/O	I2C bus (data) for RGB & DEF PROCESS (IC301)
36	P35/KI5	-	Not used	86	P02	-	Not used
37	OCP	I	B1 over current protect detection [Protection: H]	87	P03	-	Not used
38	B1_POWER	O	B1 relay control [Power on: L]	88	P04	-	Not used
39	LOB_PRO	I	Low-B protect detection [Protection: H]	89	P05	-	Not used
40	MECA_SW	I	Machine SW interrupt detection [SW Pushing: L]	90	P06	-	Not used
41	MAIN_POW	O	Main power control [Power on: L]	91	P07	-	Not used
42	LB_POWER	O	Low-B power control [Power on: L]	92	VSS	-	GND
43	VREF-	I	Reference voltage [GND Fixed]	93	P10/TM8IOA	-	Not used
44	X-RAYPRO	I	X-ray protect detection [Protection: L]	94	P11/TM8IOB	-	Not used
45	P45/AN5	-	Not used	95	P12/TM11IOA	-	Not used
46	KEY2	I	Front key scan voltage (CH+, VOL+/-)	96	P13/TM11IOB	-	Not used
47	KEY1	I	Front key scan voltage (CH-, MENU)	97	P14/TM11IC	-	Not used
48	P80/TM14OA	-	Not used	98	P15/TM12IOA	-	Not used
49	P81/TM14OB	-	Not used	99	P16/TM12IOB	-	Not used
50	AC_IN	I	AC 50/60Hz for timer clock	100	P17/TM12IC	-	Not used

2.5 MAIN PARTS LOCATION

2.5.1 PWB ASS'Y ARRANGEMENT

The PWB ASS'Y is indicated below.

No.	PWB ASS'Y name	AV-48P776	AV-48P786	AV-56P776	AV-56P786
1.	MAIN PWB	SSR-1510A-M2	←	SSR-1511A-M2	←
2.	ATSC TUNER PWB	SSD-2311A-M2	←	←	←
3.	POWER PWB	SSR-9010A-M2	←	←	←
4.	DEF & CONVERGENCE OUT PWB	SSR-2510A-M2	←	←	←
5.	DIGITAL CONVERGENCE MODULE PWB	SSR0K050A-M2	←	SSR0K051A-M2	←
6.	REMOTE SENSOR PWB	SSR-8010A-M2	←	←	←
7.	R CRT SOCKET PWB	SSR-3151A-M2	←	←	←
8.	G CRT SOCKET PWB	SSR-3251A-M2	←	←	←
9.	B CRT SOCKET PWB	SSR-3351A-M2	←	←	←
10.	FRONT CONTROL PWB	SSR0L015A-M2	←	←	←
11.	USB PWB	SSR-7561A-M2	←	←	←



2.6 SCREEN HANDLING CAUTIONS

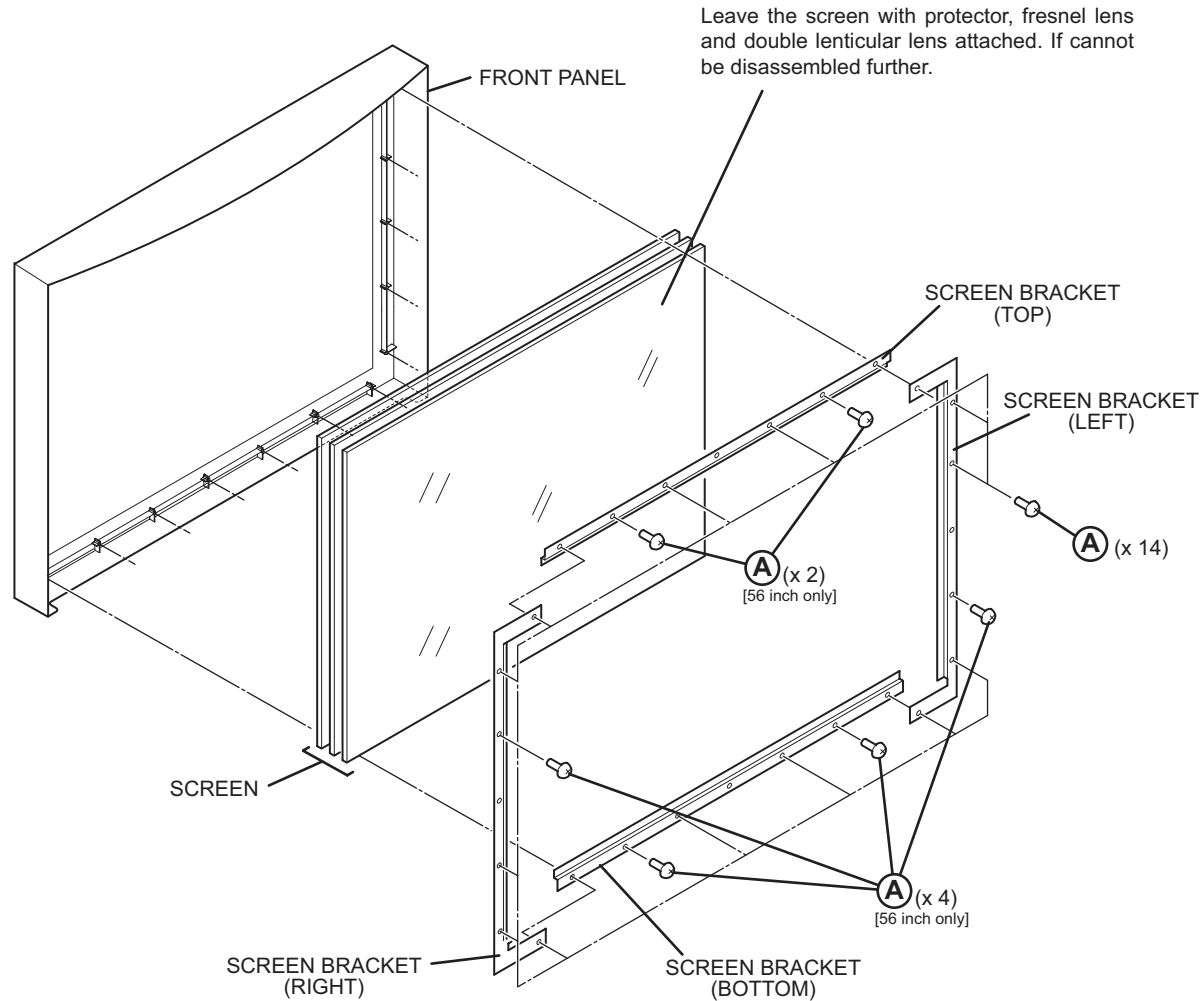
2.6.1 SCREEN STORAGE

Store the **SCREEN ASS'Y** in a standing position in order to avoid deformation. If the screen is stored horizontally, there is risk of deforming the screen face.

When necessary to place the **SCREEN ASS'Y** horizontally, position the screen side upwards and sure to place spacers between the screen and resting site (floor or stand etc.) to prevent the screen from sagging.

2.6.2 SCREEN SURFACE

Since the screen surface is easily scratched or soiled, use ample care when handling.



2.7 PROJECTION UNIT REPLACEMENT

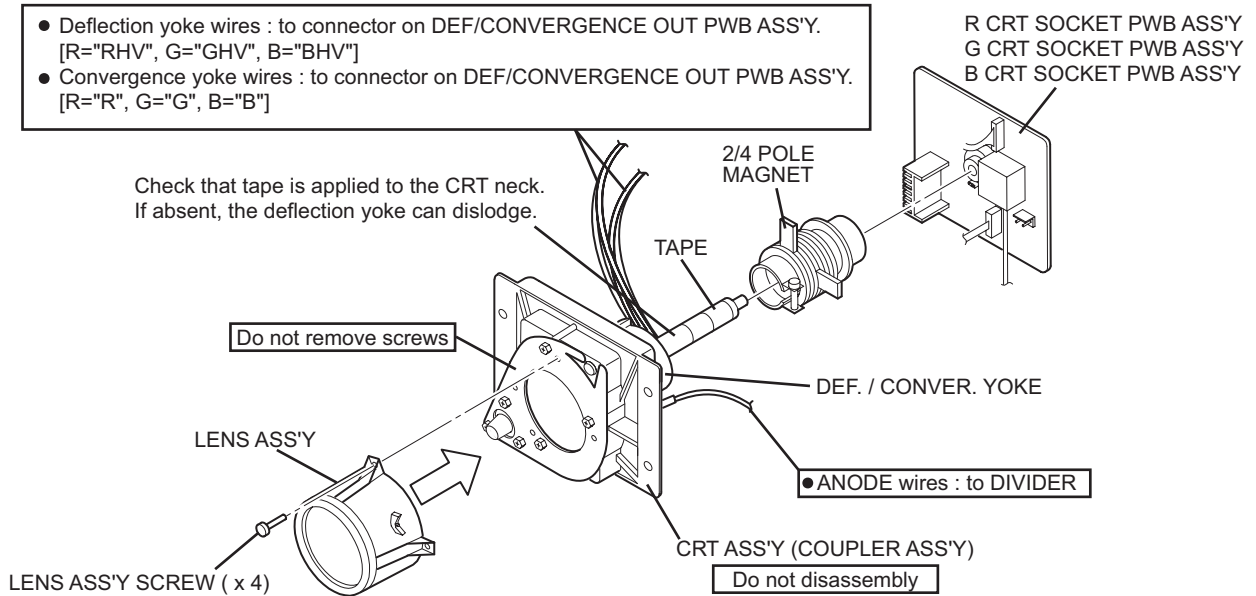
2.7.1 ADJUSTMENT DURING REPLACEMENT

When replacing the three R, G and B projection units, first replace the R and B units and perform focus / screen / raster centering adjustments with reference to the G unit. Then replace the G unit and perform G focus / screen / convergence adjustment. Finally perform R & B . Convergence adjustments. Use care to simultaneously removes all three-projection units.

2.7.2 DISASSEMBLY CAUTION

The projection units include locations that are not to be disassembled during service. When replacing projection unit parts, disassemble to the state indicated in the figure below.

The figure indicates screws and wires that are not to be removed. Use care not to remove these.



SECTION 3 DISASSEMBLY

3.1 DISASSEMBLY PROCEDURE

CAUTION AT DISASSEMBLY:

- Be sure to perform the **SYSTEM SETTING**, at the end of the procedure.
- Make sure that the power cord is disconnected from the outlet.
- Pay special attention not to break or damage the parts.
- When removing each board, remove the connectors as required. Taking notes of the connecting points (connector numbers) makes service procedure manageable.
- Make sure that there is no bent or stain on the connectors before inserting, and firmly insert the connectors.

3.1.1 REMOVING THE SPEAKER GRILL (Fig.1)

- (1) Remove 2 screws **[A]** from rear side.
- (2) Pull out the SPEAKER GRILL bottom to the front, and 4 claws which are fixing the SPEAKER GRILL are removed.
- (3) Remove the SPEAKER GRILL.
- (4) Remove the other side SPEAKER GRILL in the same manner.

3.1.2 REMOVING THE SPEAKER (Fig.1)

- Remove the SPEAKER GRILL.
 - (1) Remove 4 screws **[B]**.
 - (2) Remove the SPEAKER.
 - (3) Disconnect the speaker wire from speaker terminal.
 - (4) Remove the other side SPEAKER in the same manner.

3.1.3 REMOVING THE FRONT PANEL (Fig.1)

- Remove the SPEAKER GRILL.
 - (1) Remove 4 screws **[C]**.
 - (2) The FRONT PANEL upper is pull out to the front, and 2 claws which are fixing the FRONT PANEL are removed.
 - (3) Remove the FRONT PANEL.

3.1.4 REMOVING THE FRONT CONTROL BOX (Fig.1)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
 - (1) Remove 5 screws **[D]**.
 - (2) Remove the FRONT CONTROL BOX.

3.1.5 REMOVING THE FRONT CONTROL PWB (Fig.1)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
- Remove the FRONT CONTROL BOX.
 - (1) Remove 2 screws **[E]**.
 - (2) Remove 3 screws **[F]** from rear side of FRONT CONTROL BOX.
 - (3) Remove the FRONT CONTROL PWB.

3.1.6 REMOVING THE SCREEN ASS'Y (Fig.1)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
- Remove the FRONT CONTROL BOX.
 - (1) Remove 4 screws **[G]** attaching the SCREEN ASS'Y.
 - (2) Remove 10 screws **[H]** from rear side.
 - (3) Remove the SCREEN ASS'Y.

NOTE :

- Please place the SCREEN ASS'Y on a flat table without fail.
- Because of the large size, at least 2 persons are recommended for removal and reassemble.
- Use care not to scratch the screen during work.
- During assembly, be sure to engage the left and right tabs with the cabinet mounting positions.
- When than supporting the SCREEN ASS'Y, avoid grasping the top of the screen panel, instead grasp the left and right areas.

3.1.7 REMOVING THE MIRROR (Fig.1)

- Remove the SPEAKER GRILL
- Remove the FRONT PANEL.
- Remove the FRONT CONTROL BOX.
- Remove the SCREEN ASS'Y.
 - (1) Remove 9 screws **[J]** attaching the mirror brackets of the upper, left and right side.
 - (2) Raise slightly to disengage of the mirror from the bottom bracket. (If necessary, loosen the screws attaching the bottom bracket)
 - (3) Remove the MIRROR.

NOTE :

- The MIRROR is front coated. Do not touch the front of the MIRROR.
- At least 2 persons are recommended for removable and reassemble.

3.1.8 REMOVING THE REAR COVER (Fig.1)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
- Remove the FRONT CONTROL BOX.
- Remove the SCREEN ASS'Y.
 - (1) Remove 2 screws [K].
 - (2) Remove 2 screws [L] from front side.
 - (3) Slightly pull for backside to disengage of the REAR COVER from hooks.
 - (4) Remove the REAR COVER.

NOTE :

- Because of the large size, at least 2 persons are recommended for removal and reassemble.

3.1.9 REMOVING THE REAR PANEL (Fig.1)

- (1) Remove 12 screws [M].
- (2) Remove the REAR PANEL.

3.1.10 REMOVING THE PARTITION (Fig.1)

- Remove the REAR PANEL.
 - (1) Pull out the PARTITION backward.

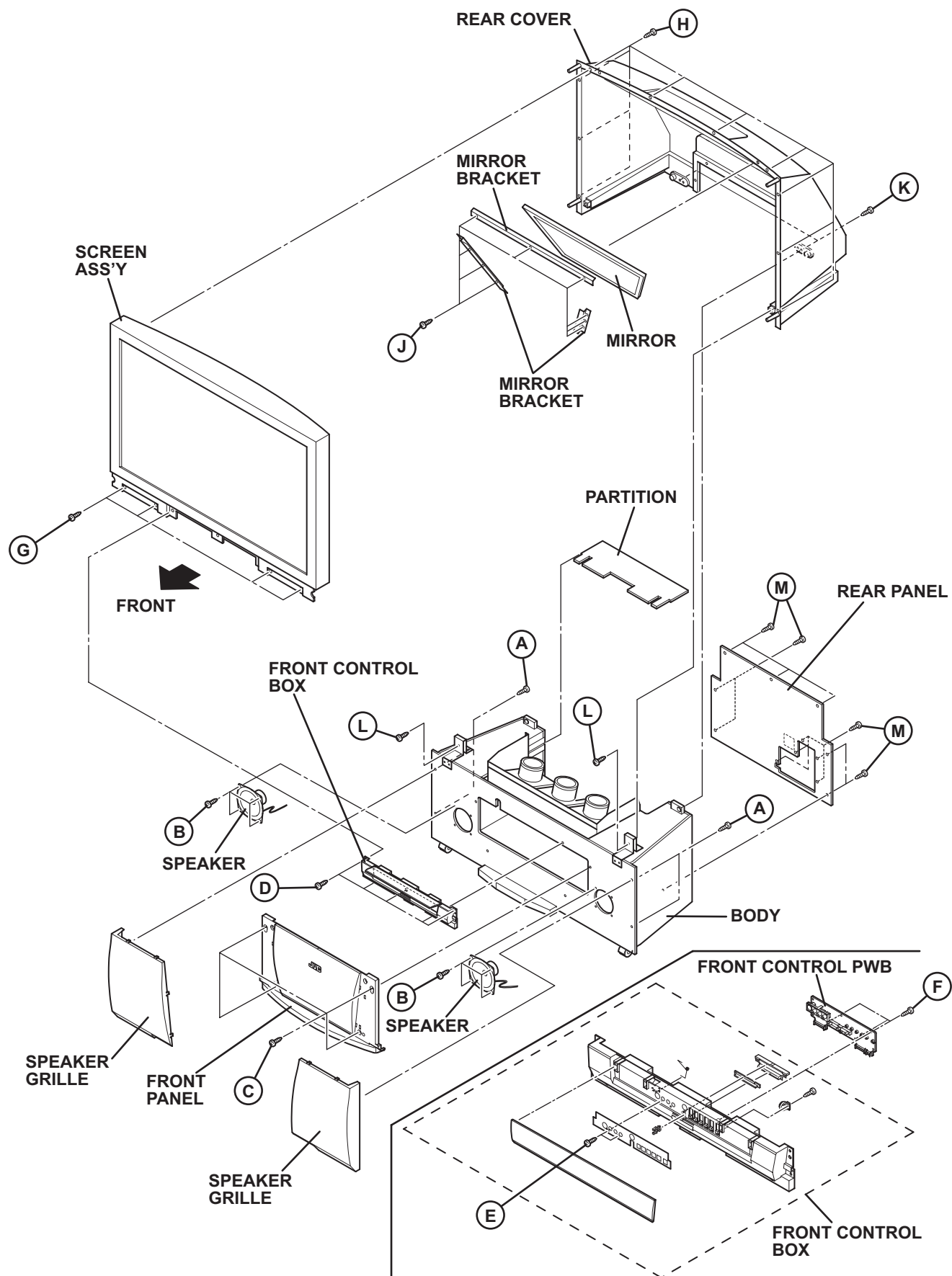


Fig.1

3.1.11 REMOVING THE MAIN UNIT (Fig.3)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
- Remove the FRONTCONTROL BOX.
- Remove the REAR PANEL.
 - (1) Remove 4 screws [N] from front side of both sides.
 - (2) Remove 2 screws [P] attaching the MAIN CHASSIS and BODY.
 - (3) Remove the SPEAKER CONNECTOR.
 - (4) Pull out the MAIN UNIT to rear side.

NOTE :

- Except for confirmation of projection of images on the screen and audio output through the speakers, the removed MAIN UNIT is still workable in the same state as if it is still built-in the TV set. Therefore, the MAIN UNIT can be removed, if necessary, for board diagnosis, electric testing, etc. apart from confirmation of screen images and audio output.
- When wire clamps are removed during work, use care to restore them precisely to their original positions. Performance can be affected if these are not returned to the original positions.
- Because of the large size, at least 2 persons are recommended for removal and reassemble.
- When carrying the MAIN UNIT, use care not to drop, shock or shake it.
- Do not stain or damage the lens of the PROJECTION UNIT.
- Do not look the projection side of a PROJECTION UNIT when the image is projected.

3.1.11.1 CHECKING THE P.W. BOARD (Fig.2)

When checking the MAIN PWB, POWER PWB, DEF & CONVERGENCE OUT PWB, etc., raise the MAIN UNIT with the front side down for the make of convenience.

3.1.12 REMOVING THE FOCUS PACK (Fig.2)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
- Remove the FRONTCONTROL BOX.
- Remove the REAR PANEL.
- Remove the MAIN UNIT.
 - (1) Remove 1 screw [Q].
 - (2) Remove the FOCUS PACK.
 - (3) Remove wires connecting the FOCUS PACK.

3.1.13 REMOVING THE AV TERMINAL BOARD (Fig.2)

- Remove the REAR PANEL.
 - (1) Remove 6 screws [R], 2 screws [S] and 2 screws [T].
 - (2) Pull out the POWER CORD CLAMP from AV TERMINAL BOARD to right side.
 - (3) Remove the AV TERMINAL BOARD.

3.1.13.1 REMOVING THE USB PWB (Fig.2)

- Remove the REAR PANEL.
- Remove the AV TERMINAL BOARD.
 - (1) Remove 2 screws [U].
 - (2) Remove the USB PWB.

3.1.14 REMOVING THE MAIN CHASSIS (Fig.2)

- Remove the REAR PANEL.
 - (1) Remove 2 screws [V].
 - (2) Pull out the MAIN CHASSIS for backside.

NOTE :

- If necessary, remove the anode wires, connectors, respectively.

3.1.15 REMOVING THE ATSC TUNER PWB (Fig.2)

- Remove the REAR PANEL.
- Remove the AV TERMINAL BOARD.
- Remove the MAIN CHASSIS.
 - (1) Remove 1 screw [W].
 - (2) Pull out the ATSC TUNER PWB.

3.1.16 REMOVING THE DIGITAL CONVERGENCE MODULE PWB (Fig.2)

- Remove the REAR PANEL.
- Remove the MAIN CHASSIS.
 - (1) Remove 2 screws [X].
 - (2) Pull out the DIGITAL CONVERGENCE MODULE PWB.

3.1.17 REMOVING THE DEF & CONVERGENCE OUT PWB (Fig.2)

- Remove the REAR PANEL.
- Remove the MAIN CHASSIS.
 - (1) Remove 1 screw [Y].
 - (2) Remove the DEF & CONVERGENCE OUT PWB.

3.1.18 REMOVING THE POWER PWB (Fig.2)

- Remove the REAR PANEL.
- Remove the MAIN CHASSIS.
 - (1) Remove 1 screw [Z].
 - (2) Remove the POWER PWB.

3.1.19 REMOVING THE PROJECTION UNIT (Fig.2)

- Remove the SPEAKER GRILL.
- Remove the FRONT PANEL.
- Remove the FRONT CONTROL BOX.
- Remove the REAR PANEL.
- Remove the MAIN UNIT.
 - (1) Remove the CRT SOCKET PWB.
 - (2) Remove 4 screws [a].
 - (3) Pull out the PROJECTION UNIT upward.

NOTE :

- Refer to "PROJECTION UNIT REPLACEMENT" when taking out and replacing the PROJECTION UNIT.
- When wire clamps are removed during work, use care to restore them precisely to their original positions. Performance can be affected if these are not returned to the original positions.

3.1.20 REMOVING THE HV DIVIDER (Fig.2)

- Remove the REAR PANEL.
 - (1) Remove 1 screw [b].
 - (2) Remove the HV DIVIDER.

NOTE :

- Wires of the transformer (FBT) and CRT of each PROJECTION UNIT can be removed by turning the connector portions.
- If necessary, remove the anode wires, and replacing the HV DIVIDER, take care to correctly engage the connector.

3.1.21 REMOVING THE REMOTE SENSOR PWB (Fig.2)

- Remove the REAR PANEL.
 - (1) Remove 1 screw [c].
 - (2) Remove the REMOTE SENSOR PWB.

3.1.22 REMOVING THE COOLANT PAN (Fig.2)

- Remove the REAR PANEL.
 - (1) Remove 2 screws [d].
 - (2) Remove the COOLANT PAN.

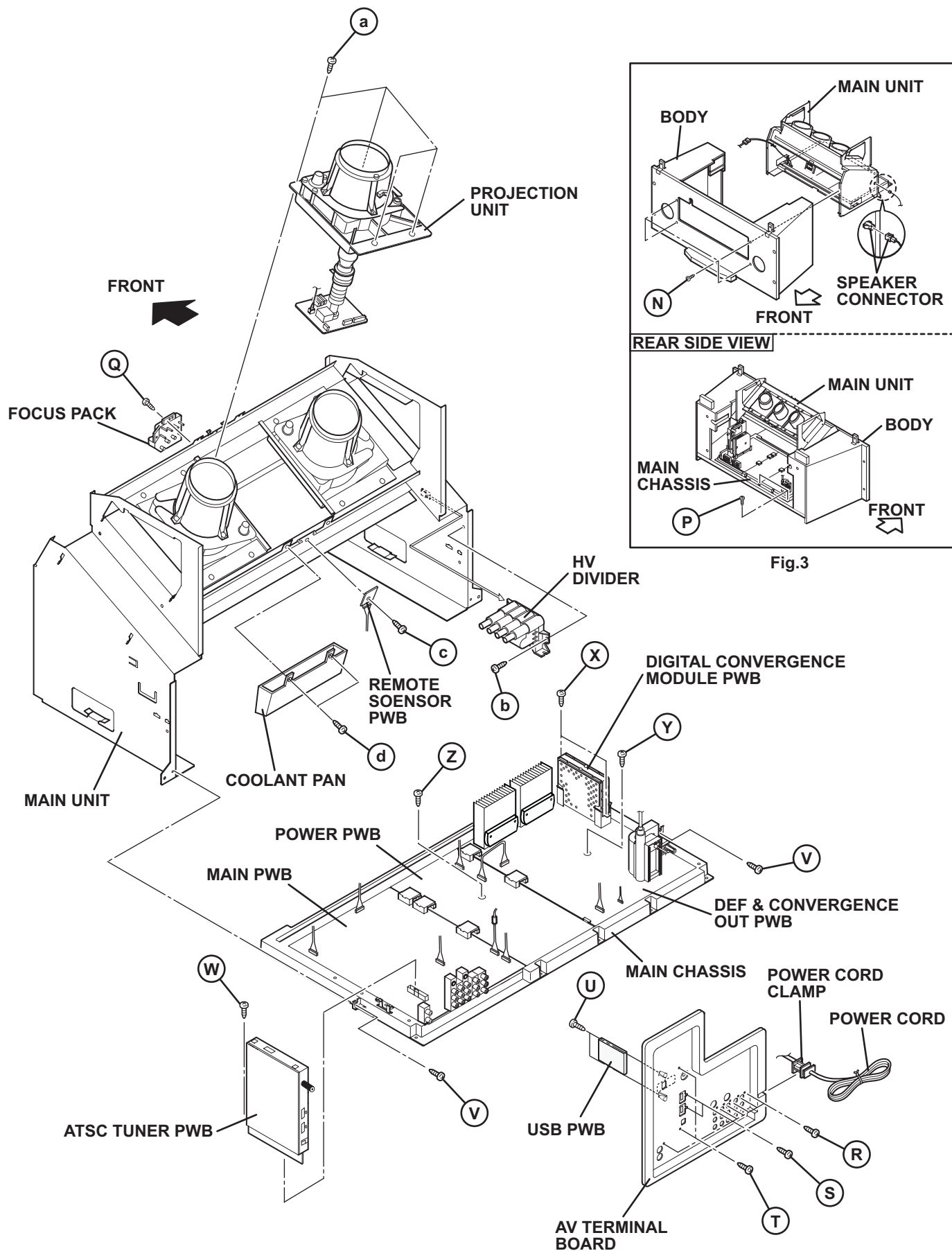


Fig.3

Fig.2

3.2 MEMORY IC REPLACEMENT

- This model uses the memory IC.
- This memory IC stores data for proper operation of the video and drive circuits.
- When replacing, be sure to use an IC containing this (initial value) data.

3.2.1 MEMORY IC TABLE

Symbol	Number of pins	Mounting PWB	Main content of data
IC702	8-pin	MAIN PWB	Setting value of Initial setting data is memorized.

3.2.2 MEMORY IC REPLACEMENT PROCEDURE

1. Power off

Switch off the power and disconnect the power plug.

2. Replace the memory IC

Be sure to use a memory IC written with the initial setting data.

3. Power on

Connect the power cord to the wall outlet and switch on the power.

4. Receiving channel setting

Refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the receive channels (Channels Preset) as described.

5. User settings

Check the user setting items according to the "FACTORY SETTING ITEM" table.

Where these do not agree, refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the items as described.

6. SERVICE MODE setting

Verify what to set in the SERVICE MODE, and set whatever is necessary(Fig.1) .

Refer to the SERVICE ADJUSTMENT for setting.

3.2.3 SERVICE MODE SETTING ITEMS

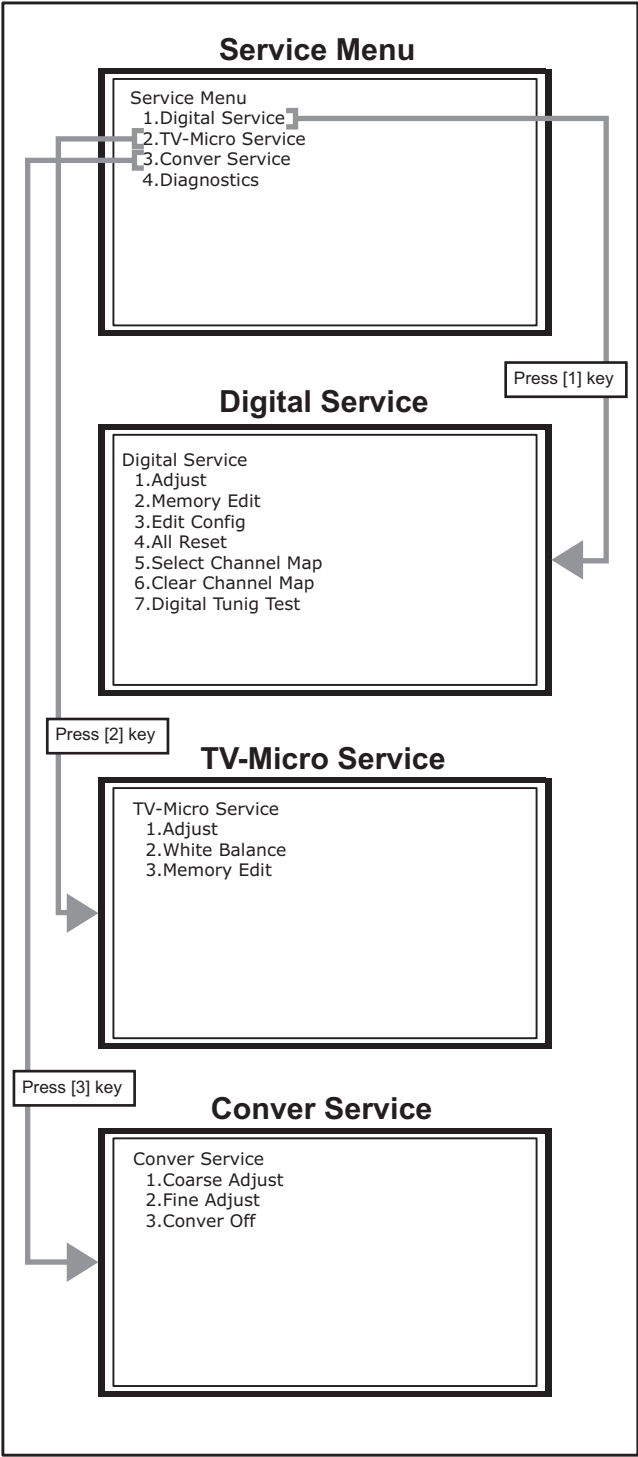


Fig.1

Setting items	Settings	Item No.
1. Digital Service		
Audio system setting	Adjust	A001 - A010
2. TV-Micro Service		
Video system setting	Adjust	S001 - S060
Deflection system	Adjust	D001 - D071
Factory system setting	Fixed	F001
3. Conver Service		
	Adjust	CPA01 - CPA11
	Adjust	CCA01 - CCA12
	Fixed	CDA01 - CDA07
	Fixed	CBA01 - CBA111

3.2.4 SETTINGS OF FACTORY SHIPMENT

3.2.4.1 BUTTON OPERATION

Setting item	Setting position
POWER	Off
CHANNEL	CABLE-02
VOLUME	10

3.2.4.2 REMOTE CONTROL DIRECT OPERATION

Setting item		Setting position
INPUT		TV
CHANNEL		CABLE-02
VOLUME		10
MUTING		OFF
DISPLAY		OFF
SLEEP TIMER		OFF
VIDEO STATUS		DYNAMIC
THEATER PRO		OFF
C.C.		OFF
MTS		STEREO
ASPECT		PANORAMA
SOUND	A.H.S.	OFF
	Smart Sound	OFF

3.2.4.3 REMOTE CONTROL MENU OPERATION

(1) INITIAL SETUP

Setting item	Setting position
Noise Muting	On
Language	English
Front Panel Lock	Off
V-Chip	Off
Set Lock Code	0000
Closed Caption	Auto(CC1/T1)
Auto Shut Off	Off
Power Indicator	High

(2) TUNER SETUP

Setting item	Setting position
Auto Tuner Setup	Unnecessary to set

(3) SOUND ADJUST

Setting item	Setting position
Bass	0
Treble	0
Balance	0
Optical Out	PCM
Turn On Volume	Current
Volume Limit	50

(4) CLOCK / TIMERS

Setting item	Setting position
Set Clock	Manual
On / Off Timer	Off

(5) EXTERNAL INPUT

Setting item	Setting position
Digital-In Size	Auto
Digital-In1 Audio	Auto
Video Input Label	All blank

(6) PICTURE ADJUST

Customers can adjust the picture setting of menu screen as their own like but the picture standard value during factory shipment is as below.

Setting item	TINT	COLOR	PICTURE	BRIGHT	DETAIL	COLOR TEMPERATURE	NOISE REDUCTION	NATURAL CINEMA
STANDARD	0	0	0	0	0	LOW	OFF	OFF
DINAMIC	0	0	+6	0	+10	HIGH	OFF	OFF
THEATER	-3	-3	-10	+1	0	HIGH	OFF	OFF
GAME	0	+7	-10	0	+7	LOW	OFF	OFF

3.3 REPLACEMENT OF CHIP COMPONENT

3.3.1 CAUTIONS

- (1) Avoid heating for more than 3 seconds.
- (2) Do not rub the electrodes and the resist parts of the pattern.
- (3) When removing a chip part, melt the solder adequately.
- (4) Do not reuse a chip part after removing it.

3.3.2 SOLDERING IRON

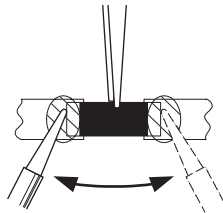
- (1) Use a high insulation soldering iron with a thin pointed end of it.
- (2) A 30w soldering iron is recommended for easily removing parts.

3.3.3 REPLACEMENT STEPS

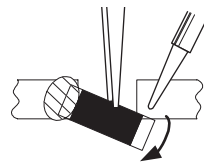
1. How to remove Chip parts

[Resistors, capacitors, etc.]

- (1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.

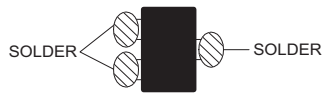


- (2) Shift with the tweezers and remove the chip part.

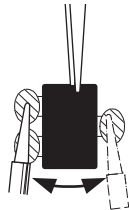


[Transistors, diodes, variable resistors, etc.]

- (1) Apply extra solder to each lead.



- (2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.



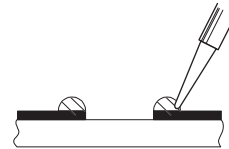
Note :

After removing the part, remove remaining solder from the pattern.

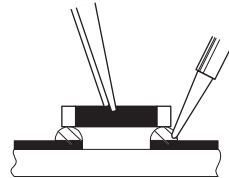
2. How to install Chip parts

[Resistors, capacitors, etc.]

- (1) Apply solder to the pattern as indicated in the figure.

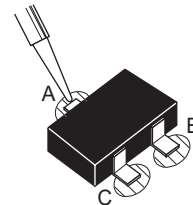


- (2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

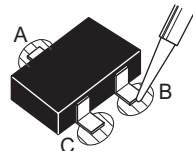


[Transistors, diodes, variable resistors, etc.]

- (1) Apply solder to the pattern as indicated in the figure.
- (2) Grasp the chip part with tweezers and place it on the solder.
- (3) First solder lead **A** as indicated in the figure.



- (4) Then solder leads **B** and **C**.



SECTION 4 ADJUSTMENT

4.1 ADJUSTMENT PREPARATION

- (1) You can make the necessary adjustments for this unit with either the Remote Control Unit or with the adjustment tools and parts as given below.
- (2) Adjustment with the Remote Control Unit is made on the basis of the initial setting values, however, the new setting values which set the screen to its optimum condition may differ from the initial settings.
- (3) Make sure that AC power is turned on correctly.
- (4) Turn on the power for set and test equipment before use, and start the adjustment procedures after waiting at least 30 minutes.
- (5) Unless otherwise specified, prepare the most suitable reception or input signal for adjustment.
- (6) Never touch any adjustment setting value which are not specified in the list for this adjustment.
- (7) Presetting before adjustment
Unless otherwise specified in the adjustment instructions, preset the following functions with the remote control unit.

SETTING POSITION

Setting item	Setting position
VIDEO STATUS	STANDARD
TINT / COLOR / PICTURE / BRIGHT / DETAIL	00 (Center)
COLOR TEMPERATURE	LOW
NOISE REDUCTION	OFF
NATURAL CINEMA	AUTO
BASS / TREBLE / BALANCE	00 (Center)
ASPECT	FULL
VERTICAL POSITION	Center
ON/OFF TIMER	OFF
AUTO SHUT OFF	OFF

4.2 MEASURING INSTRUMENT AND FIXTURES

- (1) DC voltmeter (or digital voltmeter)
- (2) Oscilloscope
- (3) Signal generator (Pattern generator)
[NTSC]
- (4) TV audio multiplex signal generator
- (5) Remote control unit
- (6) Jig Remote Control Unit [Parts number : LP20873-009A]

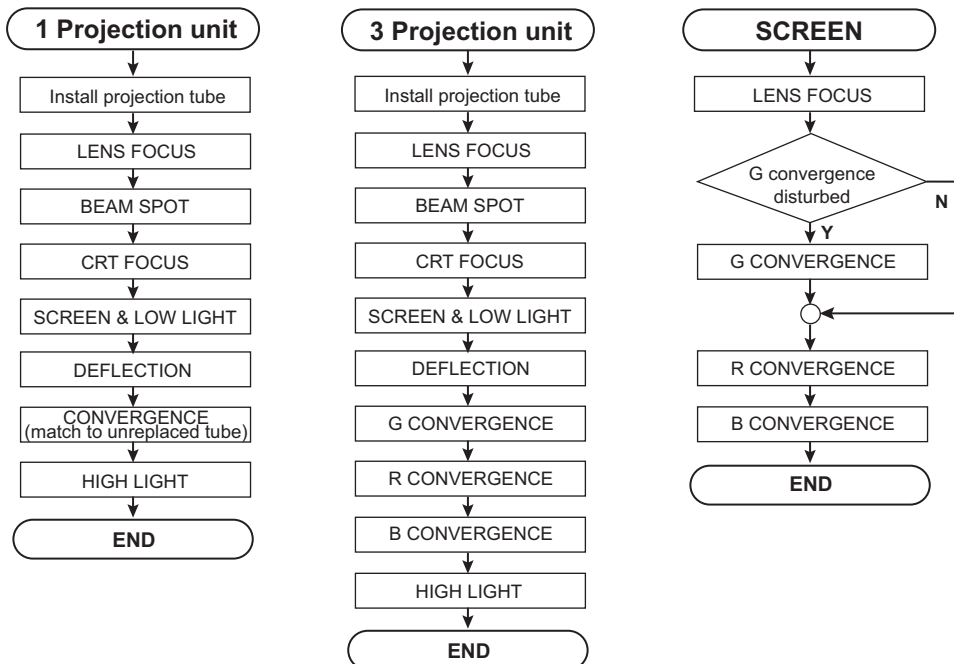
NOTE:

Please order to your parts center if you do not have this remote control unit.

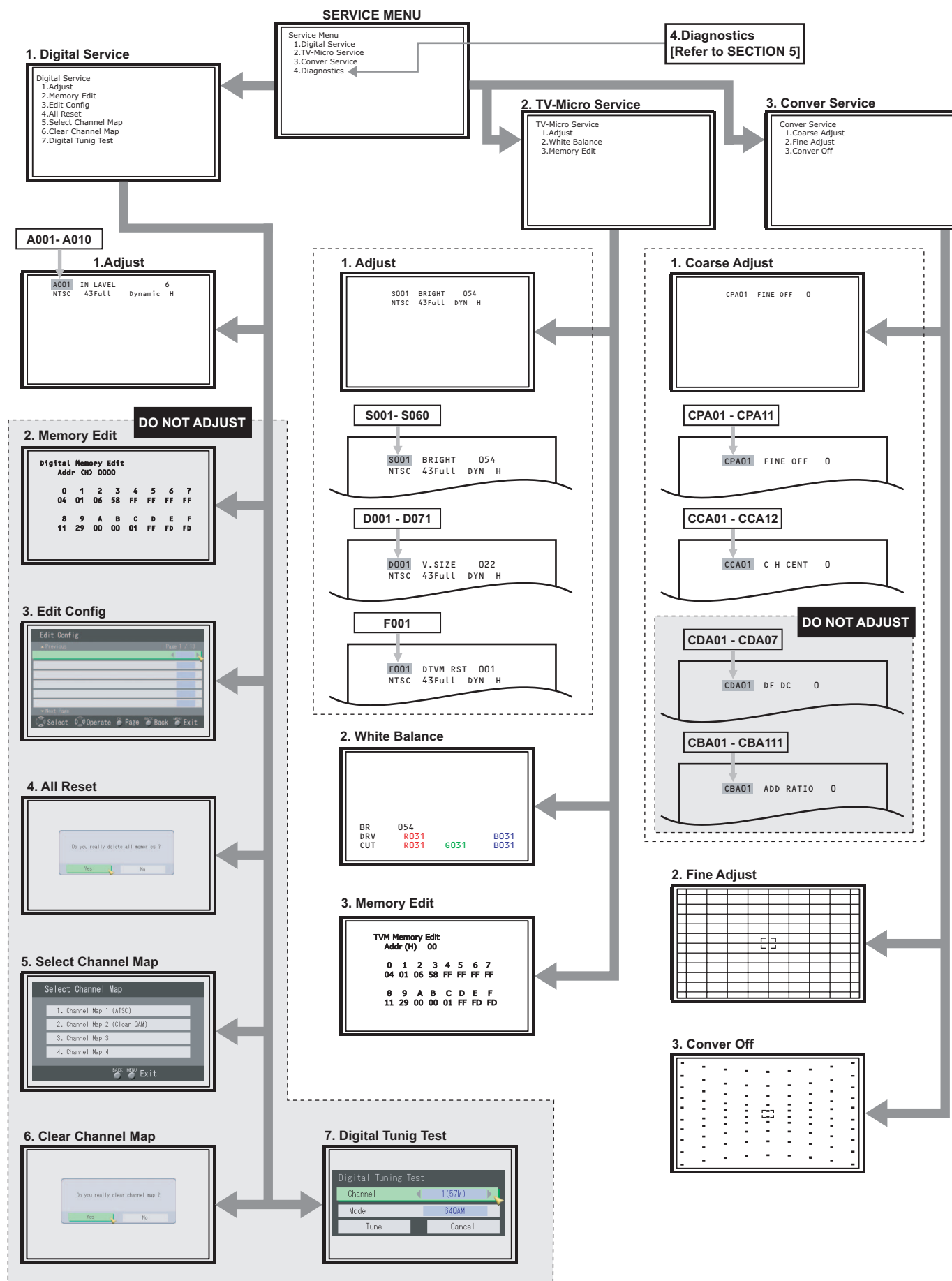
4.3 ADJUSTMENT FLOWCHART

WHEN REPLACING SCREEN AND PROJECTION UNIT

- Contains only the main adjustments. Also confirm other adjustments as required.



4.4 BASIC OPERATION OF SERVICE MENU



4.5 SERVICE MODE

4.5.1 BASIC OPERATION OF SERVICE MODE

Operate the SERVICE MODE with the REMOTE CONTROL UNIT.

4.5.1.1 HOW TO ENTER THE SERVICE MODE

- (1) Set to "0 minutes" using the [SLEEP TIMER] key.
- (2) While "0 minutes" is displayed, press the [VIDEO STATUS] key and [DISPLAY] key simultaneously.
- (3) Enter the SERVICE MODE (Fig.1)

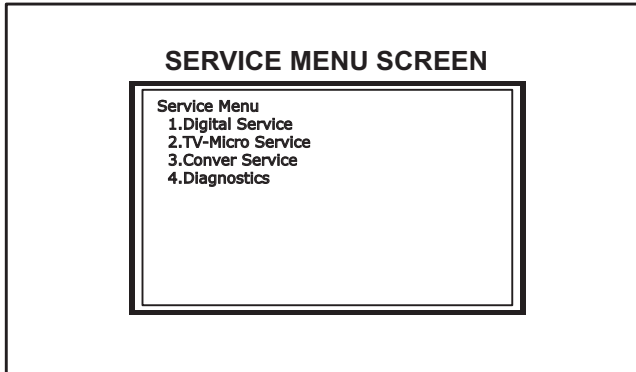


Fig.1

4.5.1.2 HOW TO EXIT THE SERVICE MODE

Press the [MENU] key to exit the SERVICE MODE.

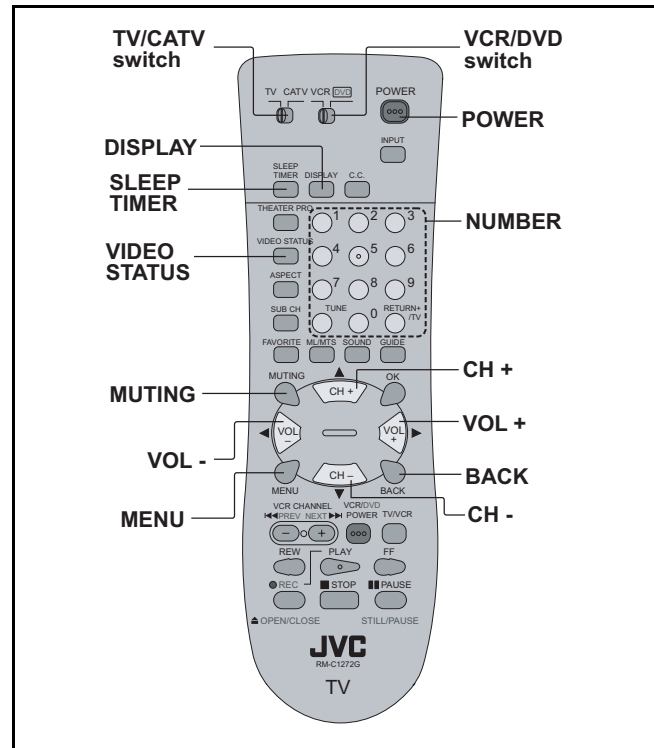
4.5.1.3 HOW TO STORE OF SETTING VALUE

When adjustment is completed, press the [MUTING] key to memorize the adjustment value.

NOTE:

If not to do it, adjustment data is not memorized to the memory IC. And if exit the adjustment mode before memorize the data, the adjustment value which you change is canceled.

4.5.1.4 SERVICE MODE SELECT KEY LOCATION

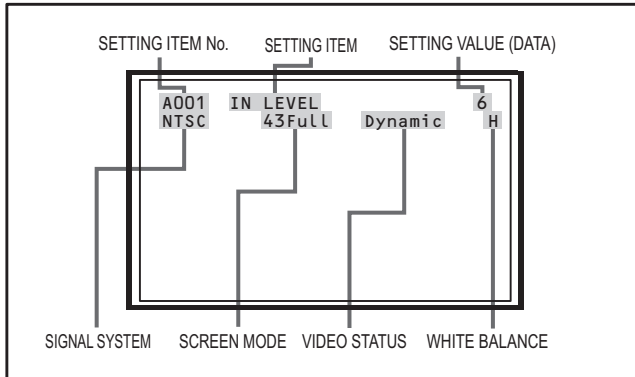


4.5.2 DESCRIPTION OF STATUS DISPLAY

The status display on the upper part of the SERVICE MODE screen is common (to all models).

4.5.2.1 DIGITAL SERVICE MODE

1. Adjust



(1) SIGNAL SYSTEM

The signal displayed on the screen is displayed.

NTSC	: 525i (Composite / S-video input)
525i	: 525i (Component input)
525p	: 525p (Component input)
750p	: 750p (Component input)
1125i	: 1125i (Component input)
D525i	: ATSC 525i
D525p	: ATSC 525p
D750p	: ATSC 750p
D1125i	: ATSC 1125i
H525i	: HDMI 525i
H525pS1	: HDMI 525p size1
H525pS2	: HDMI 525p size2
H750p	: HDMI 750p
H1125i	: HDMI 1125i

(2) SCREEN MODE

State of the ASPECT is displayed.

43Full	: FULL (Input signal 4 : 3)
43Pano	: PANORAMA (Input signal 4 : 3)
43Cinema	: CINEMA (Input signal 4 : 3)
43Regular	: REGULAR (Input signal 4 : 3)
16Full	: FULL (Input signal 16 : 9)
16Pano	: PANORAMA ZOOM (Input signal 16 : 9)
16Cinema	: CINEMA ZOOM (Input signal 16 : 9)
16Slim	: SLIM (Input signal 16 : 9)

(3) VIDEO STATUS

State of the VIDEO STATUS is displayed.

Standard	: STANDARD
Dynamic	: DYNAMIC
Theater	: THEATER
Game	: GAME

(4) WHITE BALANCE

State of the WHITE BALANCE is displayed.

H	: HIGH
L	: LOW

(5) SETTING ITEM NAME

Setting item name are displayed. For the setting item names to be displayed, refer to "INITIAL SETTING VALUE OF SERVICE MODE".

(6) SETTING ITEM NO.

Setting item numbers are displayed. The setting item numbers to be displayed are listed below.

Item No.	Setting item
A001 - A010	Audio system setting

■SELECTION OF SETTING ITEM

- [CH+] / [CH-] key.

Change the setting items up/ down.

A001... ↔ A010

(7) SETTING VALUE (DATA)

The SETTING VALUE is displayed.

■CHANGE OF SETTING VALUE (DATA)

- [VOL+] / [VOL-] key.

Change the setting values up/down.

■MEMORY OF SETTING VALUE (DATA)

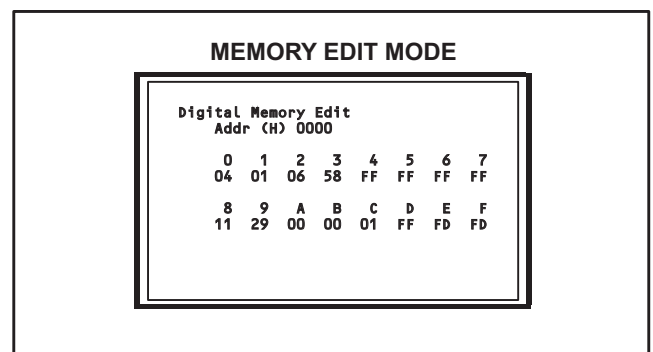
Changed setting value is memorized by pressing [MUTING] key.

2. Memory Edit

Data in the EEPROM is edited on this screen. [Do not adjust]

CAUTION:

This mode is not used in the ADJUSTMENT. Press the [BACK] key to return to the SERVICE MENU SCREEN.

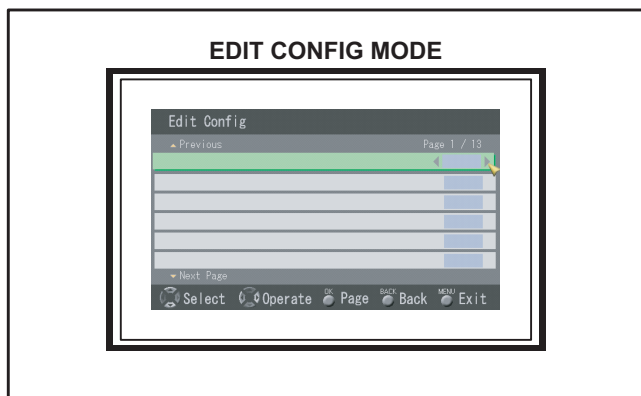


3. Edit Config

Setting value in the digital module is edited and confirmed on this screen. [Do not adjust]

CAUTION:

This mode is not used in the ADJUSTMENT. Press the **[BACK]** key to return to the SERVICE MENU SCREEN.

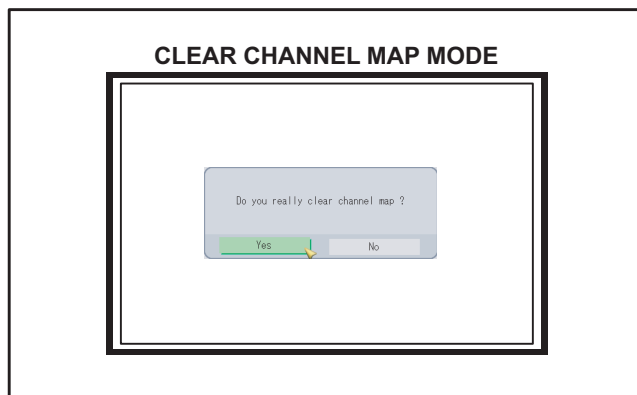


6. Clear Channel Map

Channel map is cleared on this screen. [Do not adjust]

CAUTION:

This mode is not used in the ADJUSTMENT. Press the **[BACK]** key to return to the SERVICE MENU SCREEN.

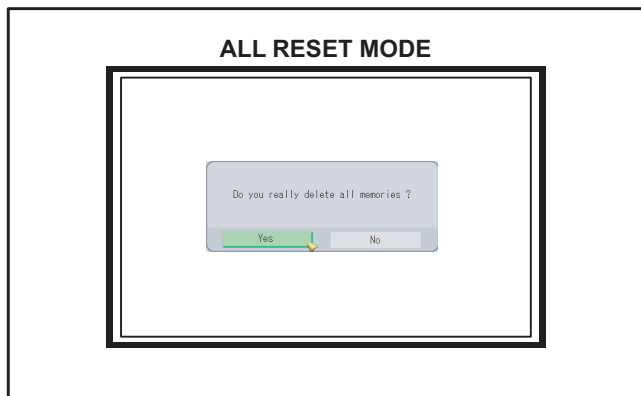


4. All Reset

Data in the EEPROM is all reset on this screen. [Do not adjust]

CAUTION:

This mode is not used in the ADJUSTMENT. Press the **[BACK]** key to return to the SERVICE MENU SCREEN.

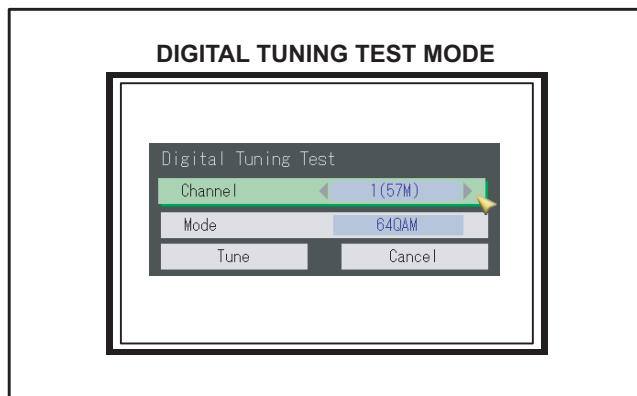


7. Digital Tuning Test

Digital channel tuning is tested on this screen. [Do not adjust]

CAUTION:

This mode is not used in the ADJUSTMENT. Press the **[BACK]** key to return to the SERVICE MENU SCREEN.

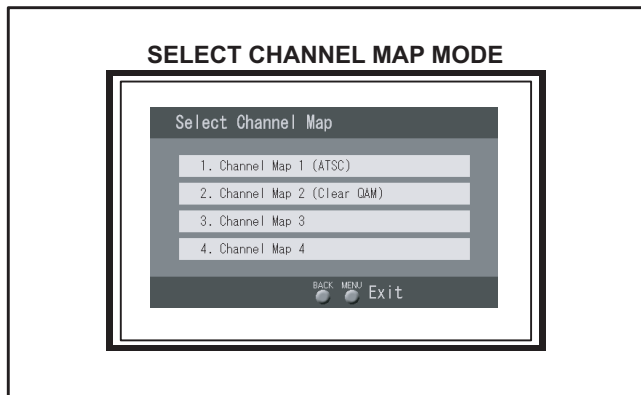


5. Select Channel Map

Channel map is forcibly rewritten on this screen.[Do not adjust]

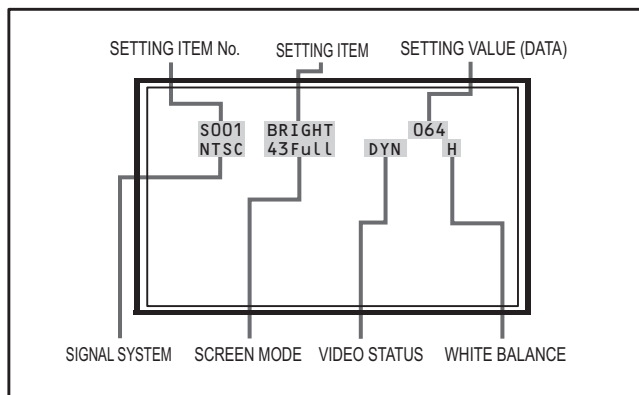
CAUTION:

This mode is not used in the ADJUSTMENT. Press the **[BACK]** key to return to the SERVICE MENU SCREEN.



4.5.2.2 TV-MICRO SERVICE MODE

1. Adjust



(1) SIGNAL SYSTEM

The signal displayed on the screen is displayed.

NTSC	: 525i (Composite / S-video input)
525i	: 525i (Component input)
525p	: 525p (Component input)
750p	: 750p (Component input)
1125i	: 1125i (Component input)
D525i	: ATSC 525i
D525p	: ATSC 525p
D750p	: ATSC 750p
D1125i	: ATSC 1125i
H525i	: HDMI 525i
H525pS1	: HDMI 525p size1
H525pS2	: HDMI 525p size2
H750p	: HDMI 750p
H1125i	: HDMI 1125i

(2) SCREEN MODE

State of the ASPECT is displayed.

43Full	: FULL (Input signal 4 : 3)
43Pano	: PANORAMA (Input signal 4 : 3)
43Cinema	: CINEMA (Input signal 4 : 3)
43Regular	: REGULAR (Input signal 4 : 3)
16Full	: FULL (Input signal 16 : 9)
16Pano	: PANORAMA ZOOM (Input signal 16 : 9)
16Cinema	: CINEMA ZOOM (Input signal 16 : 9)
16Slim	: SLIM (Input signal 16 : 9)

(3) VIDEO STATUS

State of the VIDEO STATUS is displayed.

STD	: STANDARD
DYN	: DYNAMIC
THEA	: THEATER
GAME	: GAME

(4) WHITE BALANCE

State of the WHITE BALANCE is displayed.

H	: HIGH
L	: LOW

(5) SETTING ITEM NAME

Setting item name are displayed. For the setting item names to be displayed, refer to "INITIAL SETTING VALUE OF SERVICE MODE".

(6) SETTING ITEM NO.

Setting item numbers are displayed. The setting item numbers to be displayed are listed below.

Item No.	Setting item
S001 - S060	Video system setting
D001 - D071	Deflection system
F001	Factory system setting

■SELECTION OF SETTING ITEM

- **[CH+] / [CH-]** key.
Change the setting items up/ down.

S001... ↔ D001... ↔ F001...↔ S001...

- **[SLEEP TIMER]** key.
Switch to the next items.

S001 → D001 → F001 → S001

(7) SETTING VALUE (DATA)

The SETTING VALUE is displayed.

■CHANGE OF SETTING VALUE (DATA)

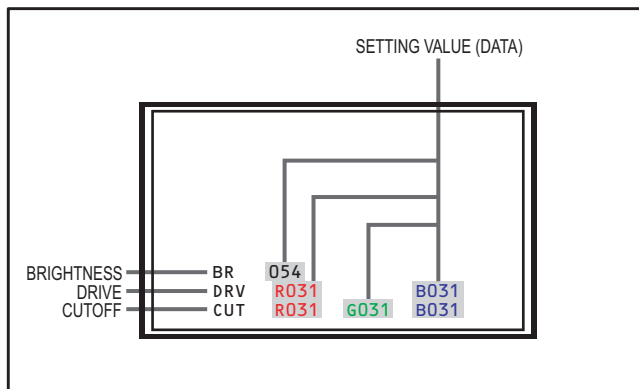
- **[VOL+] / [VOL-]** key.
Change the setting values up/down.

■MEMORY OF SETTING VALUE (DATA)

Changed setting value is memorized by pressing **[MUTING]** key.

2. White Balance

White balance data is adjusted on this screen.



BRIGHTNESS

[VOL+] key : BRIGHT is up
[VOL-] key : BRIGHT is down

DRIVE

[2] key : DRIVE R is up
[5] key : DRIVE R is down
[3] key : DRIVE B is up
[6] key : DRIVE B is down

CUTOFF

[1] key : HORIZONTAL LINE on
[4] key : HORIZONTAL LINE off
[7] key : CUTOFF G is up
[TUNE] key : CUTOFF G is down
[8] key : CUTOFF R is up
[0] key : CUTOFF R is down
[9] key : CUTOFF B is up
[RETURN+] key : CUTOFF B is down

■MEMORY OF SETTING VALUE (DATA)

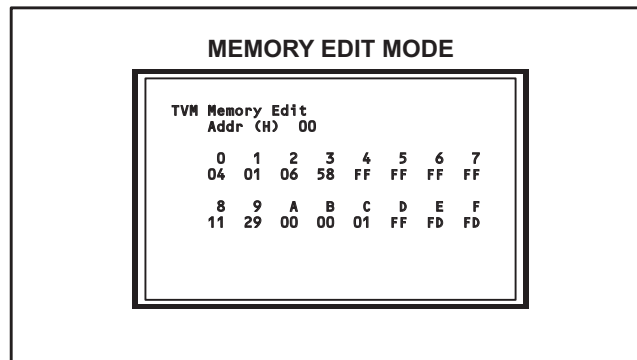
Changed setting value is memorized by pressing [MUTING] key.

3. Memory Edit

Data in the EEPROM is edited on this screen. [Do not adjust]

CAUTION:

This mode is not used in the ADJUSTMENT. Press the [BACK] key to return to the SERVICE MENU SCREEN.

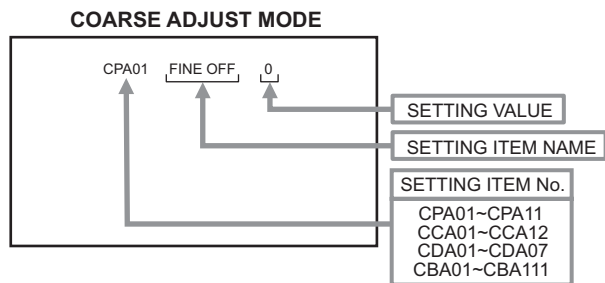


4.5.2.3 CONVER SERVICE MODE

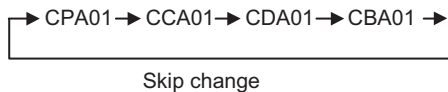
1. Coarse Adjust

Setting the CONVERGENCE PHASE and LINE (coarse) adjustment.

- This setting is described in the CONVERGENCE adjustment.



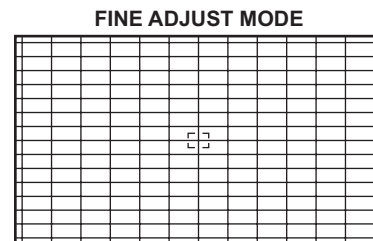
- Press [INPUT] key



2. Fine Adjust

Setting the CONVERGENCE POINT (fine).

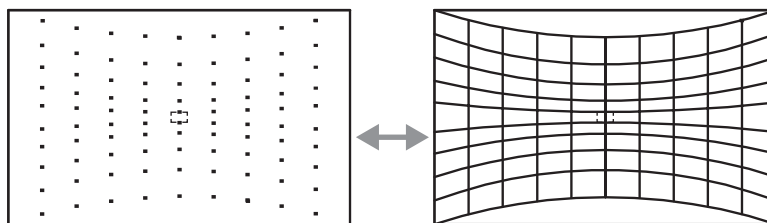
- This setting is described in the CONVERGENCE adjustment.



3. Conver Off

For FOCUS & BEAM SPOT adjustment or RASTER CENTERING adjustment, 2 test patterns are selectable without convergence operation on this screen.

- Press [INPUT] key to change the crosshatch pattern and the dot pattern.



4.6 INITIAL SETTING VALUE OF SERVICE MODE

- (1) Adjustment of the SERVICE MODE is made on the basis of the initial setting values ; however, the new setting values which set the screen in its optimum condition may differ from the initial setting.
- (2) Do not change the initial setting values of the setting items NOT LISTED IN ADJUSTMENT PROCEDURE.
- (3) --- : This mark described in each table shows "Cannot adjust it."

4.6.1 [1. Digital Service]

4.6.1.1 SOUND SETTING

No.	Setting item	Variable range	Initial setting value
A001	IN LEVEL	0 - 15	6
A002	LOW SEP	0 - 63	30
A003	HIGH SEP	0 - 63	30
A004	BASS OFS	-128 - 127	0
A005	TREB OFS	-128 - 127	0

No.	Setting item	Variable range	Initial setting value
A006	AHS MVE	-128 - 127	-3
A007	AHS MSC	-128 - 127	-1
A008	AGC FLAT	0 - 3	1
A009	BBE BASS	-128 - 127	0
A010	BBE TREB	-128 - 127	0

4.6.2 [2. TV-Micro Service]

4.6.2.1 VIDEO SETTING

No.	Setting item	Variable range	Initial setting value		
			RF		EXTERNAL (S/CV)
			STANDARD	THEATER	STANDARD
S001	BRIGHT	000 - 063	031	---	---
S002	PICTURE	000 - 063	025	---	---
S003	COLOR	000 - 063	044	---	---
S004	TINT	000 - 063	031	---	---
S005	DETAIL	000 - 063	041	---	041
S006	BRIGHT+-	-128 - +127	---	000	-009
S007	PICT+-	-128 - +127	---	000	000
S008	COLOR+-	-128 - +127	---	000	000
S009	TINT+-	-128 - +127	---	000	000
S010	DETAIL+-	-128 - +127	---	000	---

No.	Setting item	Variable range	Initial setting value					
			EXTERNAL (COMPONENT)			ATSC / HDMI		
			STANDARD					
			525i	525p	1125i/750p	525i	525p	1125i/750p
S003	COLOR	000 - 063	039	---	---	031	---	---
S004	TINT	000 - 063	031	---	---	031	---	---
S005	DETAIL	000 - 063	031	031	036	031	031	031
S006	BRIGHT+-	-128 - +127	000	---	---	000	---	---
S007	PICT+-	-128 - +127	000	---	---	000	---	---
S008	COLOR+-	-128 - +127	---	-001	-002	---	000	000
S009	TINT+-	-128 - +127	---	000	000	---	000	000

No.	Setting item	Variable range	Initial setting value							
			RF/EXTERNAL(S/CV)				EXTERNAL(COMPONENT)/ATSC/HDMI			
			STANDARD		THEATER		STANDARD		THEATER	
			LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
S011	R CUTOFF	000 - 063	036	---	---	---	---	---	---	---
S012	G CUTOFF	000 - 063	036	---	---	---	---	---	---	---
S013	B CUTOFF	000 - 063	036	---	---	---	---	---	---	---
S014	R DRIVE	000 - 063	031	---	---	---	---	---	---	---
S015	B DRIVE	000 - 063	031	---	---	---	---	---	---	---
S016	R CUT+-	-128 - +127	---	000	000	000	000	---	---	---
S017	G CUT+-	-128 - +127	---	000	000	000	000	---	---	---
S018	B CUT+-	-128 - +127	---	000	000	000	000	---	---	---
S019	R DRV+-	-128 - +127	---	+002	+006	+003	000	---	---	---
S020	B DRV+-	-128 - +127	---	+003	-012	-004	000	---	---	---

No.	Setting item	Variable range	Initial setting value				
			RF	EXTERNAL(S/CV)	EXTERNAL(COMPONENT) / ATSC / HDMI		
						525i	525p
S021	COL AXIS	000 - 003	002				002
S022	CB OFS	000 - 063	021				032
S023	CR OFS	000 - 063	032				032
S024	SYSTEM	000 - 003	003	003	003	003	003
S025	SHP F0	000 - 001	001	001	001	001	001
S026	SHP F1	000 - 003	001	001	001	001	001

No.	Setting item	Variable range	Initial setting value	
			STANDARD	THEATER
S027	LTI LEV	000 - 003	002	002
S028	LTI MODE	000 - 003	002	002
S029	DPIC LEV	000 - 003	003	003
S030	DC TRAN	000 - 003	001	001
S031	CTI LEV	000 - 003	001	001
S032	CTI MODE	000 - 003	000	000
S033	DCOL	000 - 003	000	000
S034	ABL MODE	000 - 003	002	002
S035	GAMMA	000 - 003	002	002
S036	GAMMA_L	000 - 001	001	001
S037	SUB BRI	000 - 063	048	048
S038	SUB CONT	000 - 015	008	008
S039	WB SW	000 - 001	001	001

No.	Setting item	Variable range	Initial setting value
S040	SHP CD	000 - 003	002
S041	CD OFF	000 - 001	000
S042	VM LEV	000 - 003	003
S043	VM DLY	000 - 003	002
S044	VM COR	000 - 003	002
S045	VM F0	000 - 003	000
S046	VM LMT	000 - 003	003
S047	Y OFFSET	000 - 015	007
S048	PRE OVER	000 - 003	000
S049	AGING W	000 - 001	000
S050	AGING B	000 - 001	000
S051	BLK BTM	000 - 003	000
S052	PLMT LEV	000 - 003	000
S053	G DRIVE	000 - 063	031
S054	LRGB2 LV	000 - 015	008
S055	P ABL	000 - 015	001
S056	ABL TH	000 - 015	015
S057	S ABL	000 - 003	002
S058	AKBOFF	000 - 001	001
S059	BLK OFF	000 - 001	000
S060	VMOFF DE	-128 - +127	000

4.6.2.2 DEFLECTION SETTING

No.	Setting item	Variable range	Initial setting value	
			Full Cinema Regular	Panorama
D001	V.SIZE	000 - 063	028	---
D002	V.SIZE+-	-128 - +127	---	000
D003	EW	000 - 063	010	---
D004	EW+-	-128 - +127	---	000
D005	H.SIZE	000 - 063	029	---
D006	H.SIZE+-	-128 - +127	---	000
D007	V.SCORE	000 - 015	007	---
D008	V.SCOR+-	-128 - +127	---	000
D009	V.LIN	000 - 015	007	---
D010	V.LIN+-	-128 - +127	---	000
D011	V.CENT	000 - 063	032	---
D012	EW.TRAP	000 - 063	025	---
D013	EW.TRA+-	-128 - +127	---	000
D014	BOT.CORN	000 - 063	041	---
D015	BOT.CO+-	-128 - +127	---	000
D016	TOP.CORN	000 - 063	036	---
D017	TOP.CO+-	-128 - +127	---	000
D018	V.EHT	000 - 015	000	---
D019	H.EHT	000 - 015	005	---

No.	Setting item	Variable range	Initial setting value	
			Full Cinema Regular	Panorama
D020	H CENT	000 - 063	030	---
D021	H CENT+-	-128 - +127	---	000
D022	BOW	000 - 063	032	---
D023	BOW+-	-128 - +127	---	000
D024	PARALLEL	000 - 063	029	---
D025	PARALL+-	-128 - +127	---	000
D026	EW DC	000 - 001	000	---
D027	PIN COMP	000 - 007	000	---
D028	BOT UCP	000 - 003	000	---
D029	B UCP+-	-128 - +127	---	000
D030	TOP UCP	000 - 003	000	---
D031	T UCP+-	-128 - +127	---	000
D032	BOT UCG	000 - 003	000	---
D033	B UCG+-	-128 - +127	---	000
D034	TOP UCG	000 - 003	000	---
D035	T UCG+-	-128 - +127	---	000
D036	UC POL	000 - 001	000	---
D037	UC POL+-	-128 - +127	---	000
D038	SYNC PH	000 - 001	000	---
D039	AFC MODE	000 - 003	003	---
D040	AFC EHT	000 - 007	000	---
D041	HBLK SW	000 - 001	000	---
D042	L BLK	000 - 063	063	---
D043	R BLK	000 - 063	000	---
D044	CLP PH	000 - 003	000	---
D045	CLP SHFT	000 - 001	001	---
D046	CLP GATE	000 - 001	000	---
D047	V ASP	000 - 063	003	---
D048	ASP SW	000 - 001	000	---
D049	ZOOM SW	000 - 001	000	---
D050	JMP SW	000 - 001	000	---
D051	V SCROLL	000 - 063	035	---
D052	BOT VLIN	000 - 015	000	---
D053	B VLIN+-	-128 - +127	---	000
D054	TOP VLIN	000 - 015	002	---
D055	T VLIN+-	-128 - +127	---	000
D056	VSW0 DCH	000 - 003	000	---
D057	VSW0 DCL	000 - 015	000	---
D058	VSW1 DC	000 - 015	000	---
D059	VSW0 AMP	000 - 031	000	---
D060	VSW1 AMP	000 - 031	000	---
D061	MPPR DC	000 - 015	000	---
D062	MPPR AMP	000 - 015	000	---
D063	HCPR DC	000 - 063	000	---

No.	Setting item	Variable range	Initial setting value	
			Full Cinema Regular	Panorama
D064	HCPR PH	000 - 063	000	---
D065	HCPR AMP	000 - 063	000	---
D066	VDRV SW	000 - 001	000	---
D067	VBLK SW	000 - 001	000	---
D068	BOT BLK	000 - 015	000	---
D069	TOP BLK	000 - 015	005	---
D070	RST SW	000 - 001	000	---
D071	AKBTIM	000 - 031	000	---

4.6.2.3 FACTORY SETTING

No.	Setting item	Variable range	Initial setting value
F001	DTVM RST	000 - 001	001

4.6.3 [3. Conver Service]

4.6.3.1 1. Coarse Adjust

No.	Setting item	Variable range	Initial setting value
CPA01	FINE OFF	0 - 1	0
CPA02	TPOPH	0 - 4095	114
CPA03	TPOPV LINE	0 - 255	17
CPA04	TPOPV OFST	0 - 7	0
CPA05	FINEP	0 - 4095	1245
CPA06	STARTLIN A	0 - 127	56
CPA07	STARTLIN B	-7 - 7	-1
CPA08	COARS PHAS	0 - 15	0
CPA09	COARS OFST	-511 - 511	-50
CPA10	V1OFSTA	-511 - 511	7
CPA11	V1OFSTB	-31 - 31	0

No.	Setting item	Variable range	Initial setting value		
			GREEN	RED	BLUE
CCA01	C H CENT	-512 - 511	0	-246	395
CCA02	C H SIZE	-512 - 511	-27	-54	16
CCA03	C H LIN	-512 - 511	-96	240	-348
CCA04	C H SKEW	-512 - 511	0	0	-10
CCA05	C EW PIN	-512 - 511	-91	-26	-17
CCA06	C H BOW	-512 - 511	0	-30	21
CCA07	C V CENT	-512 - 511	-19	8	12
CCA08	C V SKEW	-512 - 511	0	0	4
CCA09	C V SIZE	-512 - 511	-108	-77	-105
CCA10	C V LIN	-512 - 511	15	12	8
CCA11	C V KEY	-512 - 511	0	114	-77
CCA12	C TB PIN	-512 - 511	280	153	230

No.	Setting item	Variable range	Initial setting value
CDA01	DF DC	-512 - 511	0
CDA02	DF H1	-512 - 511	0
CDA03	DF H2	-512 - 511	0
CDA04	DF V1	-512 - 511	0
CDA05	DF V2	-512 - 511	0
CDA06	DF V1H1	-512 - 511	0
CDA07	DF V2H1	-512 - 511	0

No.	Setting item	Variable range	Initial setting value
CBA01	ADD RATIO	0 - 3	0
CBA02	INTERLACE	0 - 1	0
CBA03	CKOUT FRE	0 - 3	0
CBA04	DF MUTE	0 - 1	0
CBA05	ODD LEVEL	0 - 1	1
CBA06	HRET SAMPL	0 - 3	2
CBA07	HRETS	0 - 1	0
CBA08	HRET TIME	-512 - 511	0
CBA09	H1 CENT RE	0 - 1	1
CBA10	DF CENT RE	0 - 1	0
CBA11	VIPOLE	0 - 127	68
CBA12	V1CNTUP	0 - 4095	466
CBA13	RVCLMP STR	0 - 15	0
CBA14	RVCLMP TER	0 - 15	0
CBA15	RVCLMP CEN	0 - 1	0
CBA16	GVCLMP STR	0 - 15	0
CBA17	GVCLMP TER	0 - 15	0
CBA18	GVCLMP CEN	0 - 1	0
CBA19	BVCLMP STR	0 - 15	0
CBA20	BVCLMP TER	0 - 15	0
CBA21	BVCLMP CEN	0 - 1	0
CBA22	RHCLMP STR	0 - 15	0
CBA23	RHCLMP TER	0 - 15	0
CBA24	RHCLMP CEN	0 - 1	0
CBA25	GHCLMP STR	0 - 15	0
CBA26	GHCLMP TER	0 - 15	0
CBA27	GHCLMP CEN	0 - 1	0
CBA28	BHCLMP STR	0 - 15	0
CBA29	BHCLMP TER	0 - 15	0
CBA30	BHCLMP CEN	0 - 1	0
CBA31	PATTERN H	0 - 3	1
CBA32	PATTERN W	0 - 3	1
CBA33	HATCH PAT	0 - 15	1
CBA34	CURS SPACE	0 - 7	1
CBA35	HATCH COL	0 - 7	2
CBA36	BORDER COL	0 - 7	0

No.	Setting item	Variable range	Initial setting value
CBA37	CURSOR COL	0 - 7	2
CBA38	CROSS COL	0 - 7	0
CBA39	SQUARE COL	0 - 7	0
CBA40	XCPOS VPOS	0 - 31	16
CBA41	XCPOS HPOS	0 - 31	16
CBA42	CURSOR PAT	0 - 3	0
CBA43	MTPH1	-32767 - 32767	0
CBA44	MTPH2	-32767 - 32767	0
CBA45	MTPV1	-32767 - 32767	0
CBA46	MTPV2	-32767 - 32767	0
CBA47	YSP	-7 - 7	0
CBA48	BL1POSV	0 - 2047	0
CBA49	BL1POSH	0 - 4095	0
CBA50	BL2POSV	0 - 2047	0
CBA51	BL2POSH	0 - 4095	0
CBA52	XLPOSV	0 - 2047	580
CBA53	XLPOSH	0 - 4095	1012
CBA54	XLLENV	0 - 2047	276
CBA55	XLLENH	0 - 4095	450
CBA56	SQ1POSV	0 - 2047	30
CBA57	SQ1POSH	0 - 4095	1024
CBA58	SQ1VSIZE	0 - 255	128
CBA59	SQ1HSIZE	0 - 255	100
CBA60	SQ2POSV	0 - 2047	594
CBA61	SQ2POSH	0 - 4095	282
CBA62	SQ2VSIZE	0 - 255	100
CBA63	SQ2HSIZE	0 - 255	110
CBA64	SQ3POSV	0 - 2047	1008
CBA65	SQ3POSH	0 - 4095	1024
CBA66	SQ3VSIZE	0 - 255	160
CBA67	SQ3HSIZE	0 - 255	100
CBA68	SQ4POSV	0 - 2047	594
CBA69	SQ4POSH	0 - 4095	1642
CBA70	SQ4VSIZE	0 - 255	100
CBA71	SQ4HSIZE	0 - 255	116
CBA72	SQ5POSV	0 - 2047	547
CBA73	SQ5POSH	0 - 4095	1013
CBA74	SQ5VSIZE	0 - 255	70
CBA75	SQ5HSIZE	0 - 255	4
CBA76	SQ6POSV	0 - 2047	580
CBA77	SQ6POSH	0 - 4095	984
CBA78	SQ6VSIZE	0 - 255	4
CBA79	SQ6HSIZE	0 - 255	64
CBA80	SQ7POSV	0 - 2047	456
CBA81	SQ7POSH	0 - 4095	888

No.	Setting item	Variable range	Initial setting value
CBA82	SQ7VSIZE	0 - 255	255
CBA83	SQ7HSIZE	0 - 255	255
CBA84	SQ8POSV	0 - 2047	0
CBA85	SQ8POSH	0 - 4095	0
CBA86	SQ8VSIZE	0 - 255	0
CBA87	SQ8HSIZE	0 - 255	0
CBA88	ODEV	0 - 4095	1584
CBA89	DFP	0 - 4095	0
CBA90	PWMH1P	0 - 4095	0
CBA91	PWMH1W	0 - 4095	0
CBA92	PWMV1P	0 - 1023	30
CBA93	PWMV1W	0 - 1023	1
CBA94	PWMH2P	0 - 4095	0
CBA95	PWMH2W	0 - 4095	217
CBA96	PWMV2P	0 - 1023	0
CBA97	PWMV2W	0 - 1023	0
CBA98	PWMH3P	0 - 4095	0
CBA99	PWMH3W	0 - 4095	0
CBA100	PWMV3P	0 - 1023	0
CBA101	PWMV3W	0 - 1023	0
CBA102	PWMV4P	0 - 1023	0
CBA103	PWMV4W	0 - 1023	0
CBA104	TPMT1HP	0 - 4095	0
CBA105	TPMT1HW	0 - 4095	294
CBA106	TPMT1VP	0 - 1023	0
CBA107	TPMT1VW	0 - 1023	0
CBA108	TPMT2HP	0 - 4095	0
CBA109	TPMT2HW	0 - 4095	0
CBA110	TPMT2VP	0 - 1023	0
CBA111	TPMT2VW	0 - 1023	0

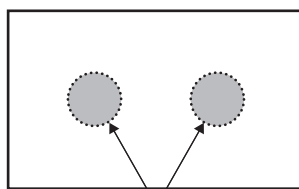
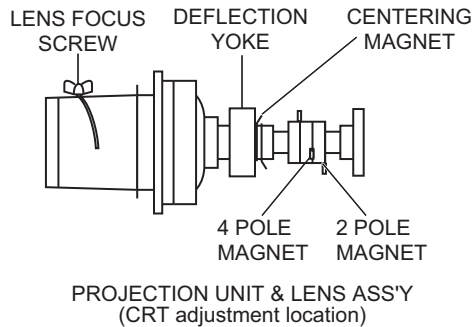
4.7 ADJUSTMENT PROCEDURE

4.7.1 CHECK ITEMS

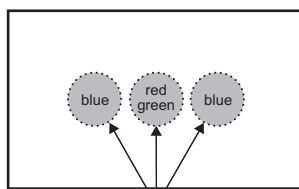
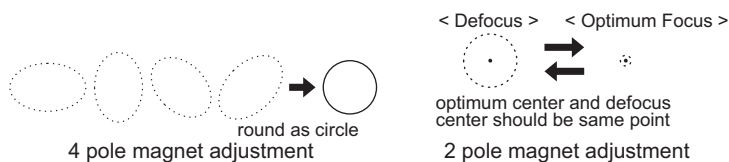
Item	Measuring instrument	Test point	Adjustment part	Description										
X-RAY PROTECTOR check	Resistor [$6.8k\Omega \pm 34\Omega$ (1/4W)]	S1 connector 2 pin : X-Ray2 3 pin : X-Ray1 [DEF&CONVERGENCE OUT PWB]		(1) Receive NTSC whole black signal. (2) Connect resistor $6.8k\Omega \pm 34\Omega$ (1/4W) between 2 pin and 3 pin of the S1 connector. (3) Make sure that the screen picture disappears. (4) Unplug the power cord. (5) Remove the resistor [$6.8k\Omega$] from S1 connector. (6) Again plug the power cord, make sure that the normal picture is displayed on the screen.										
S1 CONNECTOR <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>TP-E</td> <td>X-RAY2</td> <td>X-RAY1</td> <td>NC</td> <td>TP-91B 140.0V</td> </tr> </table> RESISTOR $6.8K\Omega \pm 34\Omega$ 1/4W S1 SERVICE CONNECTOR T502 FBT CN008 X-RAY B1 ← TP-91 TP-E R565 D562 D561 R563 R561 FR311 D311 C311 R562 3 1					1	2	3	4	5	TP-E	X-RAY2	X-RAY1	NC	TP-91B 140.0V
1	2	3	4	5										
TP-E	X-RAY2	X-RAY1	NC	TP-91B 140.0V										
HIGH VOLTAGE check	Signal generator HV voltmeter	CRT anode		(1) Receive NTSC whole black signal. (2) Connect the HV voltmeter between CRT anode and GND. (3) Check the high voltage DC $31.6kV + 1.0kV$ / $-1.5kV$.										

4.7.2 FOCUS & BEAM SPOT ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS & BEAM SPOT adjustment	Similar adhesive (Securing adhesive)		Conver Service [3. Conver Off] R Def. yoke (DY) G Def. yoke (DY) B Def. yoke (DY) [PROJECTION UNIT] R LENS FOCUS screw G LENS FOCUS screw B LENS FOCUS screw [PROJECTION UNIT (LENS ASS'Y)] 4 pole magnet 2 pole magnet [PROJECTION UNIT (R / G / B CRT neck)] R FOCUS VR G FOCUS VR B FOCUS VR [FOCUS PACK]	(1) Select FULL mode with [ASPECT] key. (2) Select DYNAMIC mode with [VIDEO STATUS] key. (3) Select 3. Conver Off from Conver Service menu, then dot pattern is appear. (4) Press [INPUT] key to appear crosshatch pattern. (5) Adjust the R, G and B DY position to mark straight horizontal line. LENS FOCUS (1) Make a red single color. NOTE : When making a single color, while adjusting focus of one CRT, put the cap on other lens. (2) Turn the R LENS FOCUS screw (in LENS ASS'Y), for optimum focus at the screen center. Check for absence of difference in the peripheral focus. If the peripheral focus is poor, slightly shift the center focus to obtain overall balanced focus. (3) In the same manner, produce green and blue single color and adjust their respective focus. (4) Fix the LENS FOCUS screws. NOTE : There is not a difference in the focus in the top and the bottom, on either side, in the diagonal. When the difference of the focus is big, remove a main lens and put a washer between the main lens and the coupler, and then re-adjust it.
	Remote control unit			BEAM SPOT (5) Change dot pattern with [INPUT] key. (6) Make a red single color. (7) Turn the R FOCUS VR clockwise from just focus point, to set the dot diameter to approx. 30mm. (8) Turn the 4 pole magnet of the projection unit CRT neck and make beam shape round as circle on the position between center and both ends of the screen. (9) Adjust the R FOCUS VR for optimum focus at the position indicated in the figure. (10) Turn the 2 pole magnet of the CRT neck as optimum focus and defocus center should become the same point. (11) In the same manner, adjust for the green and blue single color focus. (12) Secure the 4 and 2 pole magnets with similar adhesive. CRT FOCUS (13) Change crosshatch pattern with [INPUT] key. (14) Select DYNAMIC mode with [VIDEO STATUS] key. (15) Make a red single color. (16) Adjust the R FOCUS VR for optimum focus at the position indicated in the figure. (17) In the same manner, adjust for the green and blue single color focus.



BEAM SPOT adjustment point



CRT FOCUS adjustment point

4.7.3 DEFLECTION & CONVERGENCE ADJUSTMENT

- The adjustment using the remote control unit is made on the basis of the initial setting values.
- The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
- At first the adjustment in FULL mode should be done, then the data for the other ASPECT mode is corrected in the respective value at the same time.

4.7.3.1 FLOWCHART OF ADJUSTMENT

CAUTION:

All adjustments of the DEFLECTION circuit for this model should be carried out under the status without convergence operation. To enter the mode without convergence operation, the remote control unit (with LC display) **[LP20873-009]** is required. The required input code to switch off the convergence circuit is **"0FE1"**, the method is described as follows.

- (1) Take out the batteries from the remote control unit if the batteries are inserted.
- (2) Insert the batteries while pressing and holding **[4]**, **[5]** and **[6]** keys simultaneously.
- (3) While viewing the LC display of the remote control unit, set the value to **"0"** using the **[START DEBUT +]** / **[START DEBUT -]** keys.
- (4) In the same manner, set the value to **"F"** using the **[STOP FIN +]** / **[STOP FIN -]** keys.
- (5) In the same manner, set the value to **"E"** using the **[DATE +]** / **[DATE -]** keys.
- (6) In the same manner, set the value to **"1"** using the **[PR +]** / **[PR -]** keys.
- (7) When completed with all of the above settings, press the **[Transmission]** key.
- (8) The code to switch on the convergence circuit is **"0FE3"**. After adjustments, you should transmit this code in the same manner.

NOTE:

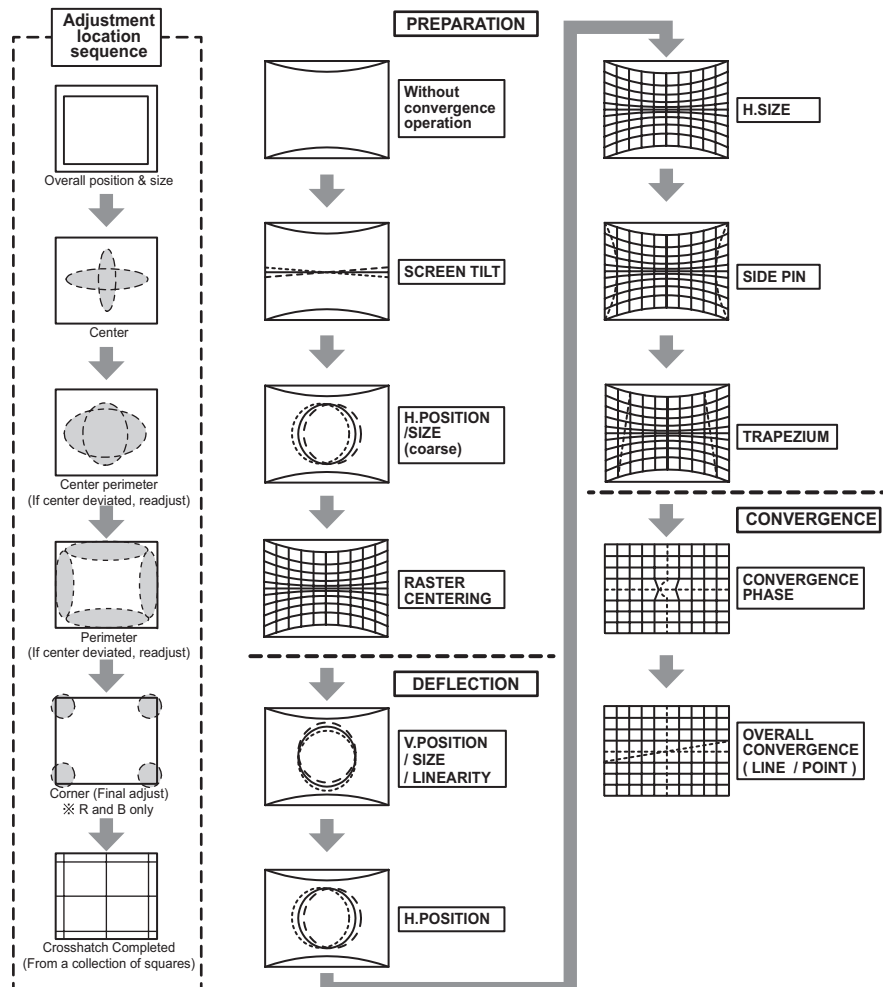
Please order to your parts center if you do not have this remote control unit.

Parts number: LP20873-009A (Remote control unit for VCR)

As a result, you can get the screen as shown in bellow figure. Adjust the DEFLECTION circuit in order of the steps indicated by the downward arrows.

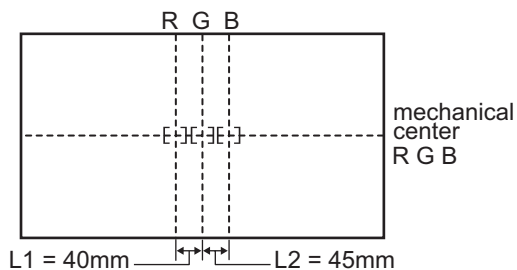
NOTE:

When every adjustment of the DEFLECTION circuit has completed, start the adjustment of convergence.

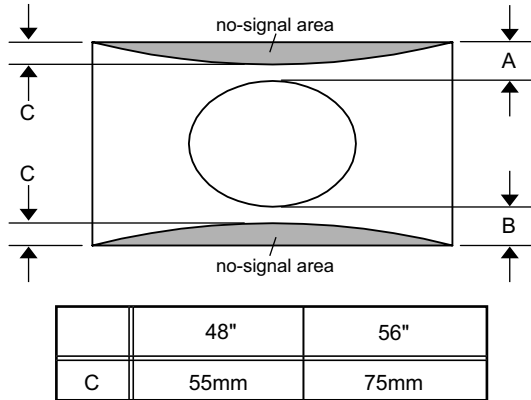
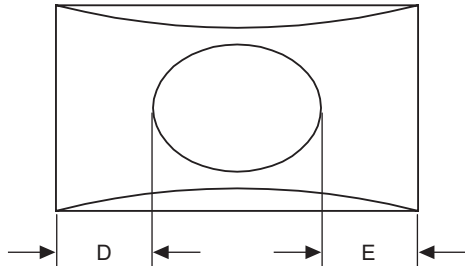
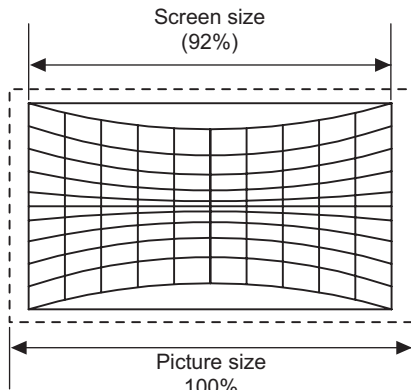


4.7.3.2 PREPARATION

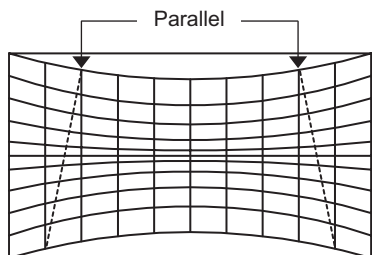
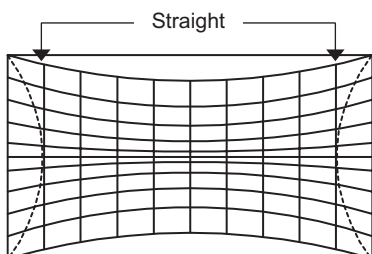
Item	Measuring instrument	Test point	Adjustment part	Description
SCREEN TILT adjustment	Remote control unit		Conver Service [3. Conver Off] G DEF. YOKE R DEF. YOKE B DEF. YOKE [PROJECTION UNIT]	- Confirm correct FOCUS adjustment. (1) Enter Conver Service [3. Conver Off]. (2) Select crosshatch pattern with [INPUT] key. (3) Make a green single color. NOTE : When making a single color, while adjusting of one CRT, put the cap on other lens. (4) Temporarily secure the G deflection yoke to the top of the neck and adjust the tilt of the deflection yoke so that the horizontal line at the center becomes flat. After adjustment, fasten the temporal screw. (5) Adjust the tilt of the R and B deflection yokes in the same manner as for G. NOTE : Make sure that the adjustment of CRT FOCUS is optimized at the center and at the fringe of the center in turn. If the proper adjustment has not been done, adjust FOCUS VR again.
H. POSITION / H. SIZE (coarse) adjustment	Signal generator Remote control unit		TV-Micro Service [1. Adjust] D005 : H. SIZE D020 : H. CENT	(1) Receive NTSC circle (or crosshatch) signal. (2) Switch off the convergence circuit. (3) Enter TV-Micro Service [1. Adjust]. (4) Make a green single color. NOTE : When making a single color, while adjusting of one CRT, put the cap on other lens. (5) Select <D005> (H. SIZE) and shorten the level until and perpendicular amplitude of vibration with until the blanking in Left and Right and on either side can be seen. (6) Select <D020> (H. CENT) and adjust horizontal position to make the screen center and signal center same. (7) Select <D005> and adjust horizontal size to make screen picture approx. 92% of H-SIZE. (8) Press [MUTING] key to memorize the set value. (9) After adjustment, switch on the convergence circuit. NOTE : Refer to the FLOWCHART OF ADJUSTMENT for the way to switch off/on the convergence circuit.
RASTER CENTERING adjustment	Remote control unit		Conver Service [3. Conver Off] G CENTERING magnet R CENTERING magnet B CENTERING magnet [PROJECTION UNIT]	NOTE : Carry out after finishing adjustment of H. POSITION and H. SIZE. (1) Enter Conver Service [3. Conver Off] and select crosshatch pattern with [INPUT] key. (2) Adjust G CENTERING magnet to make horizontal and vertical line center as mechanical center of screen. (3) Red and blue color too, are reflected by it. (4) Using R CENTERING magnet and B CENTERING magnet, adjust for the line of the red(L1) and the blue(L2) to become the position of the left figure. NOTE : Vertical center position of the red and blue are the same as green.



4.7.3.3 DEFLECTION ADJUSTMENT [2. TV-Micro Service]

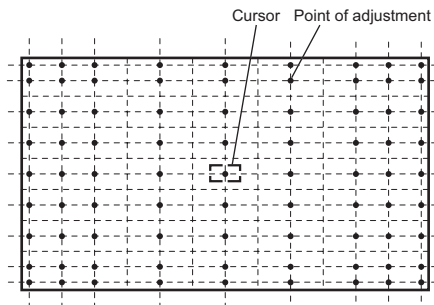
Item	Measuring instrument	Test point	Adjustment part	Description						
V. POSITION / V.SIZE / V.LINEARITY adjustment	Signal generator Remote control unit		[1. Adjust] D001 : V. SIZE D009 : V. LIN D011 : V. CENT	- To memorize every time after finish adjustment on each mode. (1) Receive NTSC circle pattern signal. (2) Select FULL mode with [ASPECT] key. (3) Switch off the convergence circuit. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <D001> (V. SIZE), <D009> (V. LIN) and <D011> (V. CENT). (6) Adjust <D001>, <D009> and <D011> to make A = B (precision $\pm 2\text{mm}$), and adjust to make C same value as table. (7) Press [MUTING] key to memorize the set value. (8) After adjustment, switch on the convergence circuit. NOTE : Do not adjust <D007> (V. SCORE), if it is different vertical position after adjust vertical linearity, to adjust vertical position. NOTE : Refer to the FLOWCHART OF ADJUSTMENT for the way to switch off/on the convergence circuit..						
 <table><tr><td></td><td>48"</td><td>56"</td></tr><tr><td>C</td><td>55mm</td><td>75mm</td></tr></table>					48"	56"	C	55mm	75mm	
	48"	56"								
C	55mm	75mm								
H. POSITION adjustment	Signal generator Remote control unit		[1.Adjust] D020 : H. CENT	(1) Receive NTSC circle pattern signal. (2) Select FULL mode with [ASPECT] key. (3) Switch off the convergence circuit. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <D020> (H. CENT). (6) Adjust <D020> to make D = E as shown figure. (7) Press [MUTING] key to memorize the set value. (8) After adjustment, switch on the convergence circuit. NOTE : Refer to the FLOWCHART OF ADJUSTMENT for the way to switch off/on the convergence circuit.						
										
H. SIZE adjustment	Signal generator Remote control unit		[1.Adjust] D005 : H. SIZE	(1) Receive NTSC crosshatch signal. (2) Select FULL mode with [ASPECT] key. (3) Switch off the convergence circuit. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <D005> (H. SIZE). (6) Adjust <D005> to make sure that the vertical screen size of the picture size is 92%. (7) Press [MUTING] key to memorize the set value. (8) After adjustment, switch on the convergence circuit. NOTE : Refer to the FLOWCHART OF ADJUSTMENT for the way to switch off/on the convergence circuit.						
										

Item	Measuring instrument	Test point	Adjustment part	Description
SIDE PIN adjustment	Signal generator Remote control unit		[1.Adjust] D003 : EW D014 : BOT.CORN D016 : TOP.CORN	(1) Receive NTSC crosshatch signal. (2) Select FULL mode with [ASPECT] key. (3) Switch off the convergence circuit. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <D003> (EW), <D014> (BOT.CORN) and <D016> (TOP.CORN). (6) Adjust <D003>, <D014> and <D016> to make the vertical lines at the left and right edges of the screen straight. (7) Press [MUTING] key to memorize the set value. (8) After adjustment, switch on the convergence circuit. NOTE : After making adjustments, confirm that the horizontal position is properly adjusted. If the horizontal is out of alignment, readjust it. Adjust H. SIZE & SIDE PIN reparably. NOTE : Refer to the FLOWCHART OF ADJUSTMENT for the way to switch off/on the convergence circuit.
TRAPEZIUM adjustment	Signal generator Remote control unit		[1.Adjust] D012 : EW.TRAP	(1) Receive NTSC crosshatch signal. (2) Select FULL mode with [ASPECT] key. (3) Switch off the convergence circuit. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <D012> (EW.TRAP). (6) Adjust <D012> to bring the vertical lines at the right and left edges of the screen parallel. (7) After adjustment, switch on the convergence circuit. (8) Press [MUTING] key to memorize the set value. NOTE : After making adjustments, confirm that the horizontal position is properly adjusted. If the horizontal is out of alignment, readjust it. Adjust H. SIZE & SIDE PIN reparably. NOTE : Refer to the FLOWCHART OF ADJUSTMENT for the way to switch off/on the convergence circuit.



4.7.3.4 CONVERGENCE ADJUSTMENT [3. Conver Service]

Item	Measuring instrument	Test point	Adjustment part	Description
CONVERGENCE PHASE check	Remote control unit		[1.Coarse Adjust] CPA02 : TPOPH CPA03 : TPOPV LINE CPA04 : TPOPV OFST CPA05 : FINEP CPA06 : STARTLIN A CPA07 : STARTLIN B CPA08 : COARS PHAS CPA09 : COARS OFST CPA10 : V1OFSTA CPA11 : V1OFSTB	(1) Enter Conver Service [1. Coarse Adjust]. (2) Select <CPA> item with [INPUT] key. (3) Check and set data that <CPA02> to <CPA11> are same as the initial setting values. (4) Press [MUTING] key to memorize the set values.
OVERALL CONVERGENCE (LINE) check	Remote control unit		[1.Coarse Adjust] CPA01 : FINE OFF CCA01 : C H CENT CCA02 : C H SIZE CCA03 : C H LIN CCA04 : C H SKEW CCA05 : C EW PIN CCA06 : C H BOW CCA07 : C V CENT CCA08 : C V SKEW CCA09 : C V SIZE CCA10 : C V LIN CCA11 : C V KEY CCA12 : C TB PIN	(1) Enter Conver Service [1. Coarse Adjust]. (2) Select <CPA01> (FINE OFF). (3) Change the data 0 to 1. (Clear the fine adjustment data) (4) Select <CCA> item with [INPUT] key. Then a green crosshatch pattern for adjustment will be displayed on the screen. (5) Check and set data <CCA01> to <CCA12> are same as the initial setting values. (6) Press [SLEEP TIMER] key to change the adjusting color to red and blue. (7) In the same manner, check and set data for red and blue patterns. (8) Press [MUTING] key to memorize the set values. (9) Select <CPA01>. (10) Change the <CPA01> 1 to 0. (11) Press [MUTING] key to memorize the set values.
OVERALL CONVERGENCE (POINT) adjustment	Remote control unit		[2. Fine Adjust]	NOTE: Perform this adjustment after performing OVERALL CONVERGENCE (LINE) check. (1) Enter Conver Service [2. Fine Adjust]. Then appear green crosshatch pattern for adjustment. (2) Press [2] / [4] / [5] / [6] / [8] keys respectively, move the cursor to the adjusting point. (3) Press [CH+] / [CH-] / [VOL+] / [VOL-] keys, adjust the position of the adjusting point. (4) Press [SLEEP TIMER] key to select the red and blue crosshatch patterns, respectively, and make convergence adjustments so that they align with the adjusting points of the green crosshatch pattern (reference color). (5) Press [OK] key to change the display colors to 3 colors from 2 colors (adjusting color + green) and make sure that the convergence has been aligned with each other. (6) Press [MUTING] key to memorize the set values.

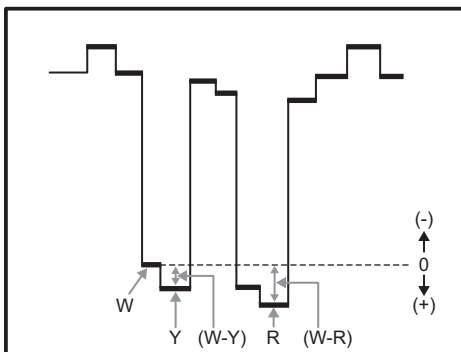


4.7.4 VIDEO ADJUSTMENT [2. TV-Micro Service]

Item	Measuring instrument	Test point	Adjustment part	Description
RGB CUTOFF adjustment	Signal generator Oscilloscope Remote control unit	TP-R [R CRT SOCKET PWB] TP-G [G CRT SOCKET PWB] TP-B [B CRT SOCKET PWB] TP-E (GND)	[1. Adjust] S001 : BRIGHT S011 : R CUTOFF S012 : G CUTOFF S013 : B CUTOFF R SCREEN VR G SCREEN VR B SCREEN VR [FOCUS PACK]	(1) Receive NTSC signal (include 3% black). (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Select FULL mode with [ASPECT] key. (4) Set the COLOR TEMP is LOW mode. (5) Connect the oscilloscope to TP-G. (6) Enter TV-Micro Service [1. Adjust]. (7) Select <S001> (BRIGHT). (8) Set <S001> to 031. (9) Select <S012> (G CUTOFF). (10) Adjust <S012> so that the 3% signal portion and the 100% signal portion of both sides may become the 180V. (11) Press [MUTING] key to memorize the set value. (12) Connect the oscilloscope to TP-R and <S011> (R CUTOFF) adjust same manner as for (6.) to (11.) above. (13) Connect the oscilloscope to TP-B and <S013> (B CUTOFF) adjust same manner as for (6.) to (11.) above. (14) Adjust SCREEN VR for RGB respectively, so that the black (3%) becomes faintly whitish. NOTE : If it is difficult to adjust the SCREEN precisely, adjust the SCREEN VR for one of 3 colors while masking other 2 colors.
WHITE BALANCE (LOW LIGHT) adjustment	Signal generator Remote control unit		[1.Adjust] S022: CB OFS S023: CR OFS [2.White Balance]	(1) Receive the NTSC black and white signal (color off). (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Set the COLOR TEMP is LOW mode. (4) Enter TV-Micro Service [1. Adjust]. (5) Set the initial setting value of <S022> (CB OFS) and <S023> (CR OFS). (6) Enter TV-Micro Service [2. White Balance]. (7) Adjust BRIGHT to make a little bright for +3% black level by [VOL+] / [VOL-] key. (8) Press the [MUTING] key to memorize the set value. NOTE : When it is insufficient in the adjustment, adjust <S022> (CB OFS) and <S023> (CR OFS) closely to make white for +3% black level.

Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE (HIGH LIGHT) adjustment	Signal generator Remote control unit		[1.Adjust] S014: R DRIVE S015: B DRIVE [2.White Balance]	- WHITE BALANCE(LOW LIGHT) adjustment should be finished. (1) Receive the NTSC black and white signal (color off). (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Set the COLOR TEMP is LOW mode. (4) Enter TV-Micro Service [1. Adjust]. (5) Set the initial setting value of <S014> (R DRIVE) and <S015> (B DRIVE). (6) Enter TV-Micro Service [2. White Balance]. (7) Adjust the screen until it becomes white by using the [2], [3], [5] and [6] keys. (8) Press the [MUTING] key to memorize the set value.
REMOTE CONTROL UNIT R DRIVE ▲ B DRIVE ▲ 1 2 3 R DRIVE ▼ B DRIVE ▼ 4 5 6 7 8 9 TUNE 0 RETURN▶				
SUB BRIGHT adjustment	Remote control unit		[1.Adjust] S001: BRIGHT	(1) Receive any broadcast. (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Set the COLOR TEMP is LOW mode. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <S001> (BRIGHT). (6) Set the initial setting value. (7) If the brightness is not the best with the initial setting value, make fine adjustment until you get the best brightness. (8) Press [MUTING] key to memorize the set value.
SUB CONTRAST adjustment (1)	Remote control unit		[1.Adjust] S002 : PICTURE	[Method of adjustment without measuring instrument] (1) Receive any broadcast. (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Set the COLOR TEMP is LOW mode. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <S002> (PICTURE). (6) Set the initial setting value. (7) If the contrast is not the best with the initial setting value, make fine adjustment of the <S002> until you get the optimum contrast. (8) Press [MUTING] key to memorize the set value.
SUB CONTRAST adjustment (2)	Signal generator Oscilloscope Remote control unit	TP-G [G CRT SOCKET PWB] TP-E (GND)	[1.Adjust] S002 : PICTURE	[Method of adjustment with measuring instrument] (1) Receive NTSC gray scale signal. (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Select FULL mode with [ASPECT] key. (4) Set the COLOR TEMP is LOW mode. (5) Connect the oscilloscope to TP-G. (6) Enter TV-Micro Service [1. Adjust]. (7) Select <S002> (PICTURE). (8) Adjust <S002> so that the 0% signal portion and the 100% signal portion of both sides may become 59V. (9) Press [MUTING] key to memorize the set value.

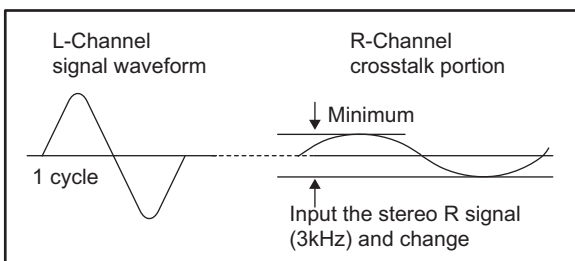
Item	Measuring instrument	Test point	Adjustment part	Description
SUB COLOR / SUB TINT adjustment (1)	Remote control unit		[1.Adjust] S003 : COLOR S004 : TINT	[Method of adjustment without measuring instrument] (1) Receive any broadcast. (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Enter TV-Micro Service [1. Adjust]. (4) Select <S003> (COLOR) and <S004> (TINT). (5) Set the initial setting value. (6) If the color or tint is not the best with the initial setting values, make fine adjustment until you get the best color or the best tint. (7) Press [MUTING] key to memorize the set value.
SUB COLOR / SUB TINT adjustment (2)	Signal generator Oscilloscope Remote control unit	TP-R [R CRT SOCKET PWB] TP-E (GND)	[1.Adjust] S003 : COLOR S004 : TINT	[Method of adjustment with measuring instrument] (1) Receive NTSC color bar signal (include 75% white). (2) Select STANDARD mode with [VIDEO STATUS] key. (3) Connect the oscilloscope to TP-R. (4) Enter TV-Micro Service [1. Adjust]. (5) Select <S003> (COLOR) and <S004> (TINT). (6) Adjust <S003> and <S004> to be following setting value. (Refer to the table) (7) Press [MUTING] key to memorize the set value. (8) Confirm that LOW-LIGHT is not different after adjusting. If it is green or magenta, to adjust LOW-LIGHT again. If adjust again, to set offset value again.



Setting item	Setting value [V]	
	STANDARD	
Signal	S003(W-R)	S004 (W-Y)
NTSC	+11	0

4.7.5 MTS ADJUSTMENT [1. Digital Service]

Item	Measuring instrument	Test point	Adjustment part	Description
MTS INPUT LEVEL adjustment	Remote control unit		[1.Adjust] A001: IN LEVEL	(1) Receive any broadcast. (2) Enter Digital Service [1. Adjust]. (3) Select the <A001> (IN LEVEL). (4) Set the initial setting value of the <A001>. (5) Press the [MUTING] key to memorize the set value.
MTS SEPARATION adjustment	TV audio multiplex signal generator Oscilloscope Remote control unit	R OUT L OUT [AUDIO OUT]	[1.Adjust] A002: LOW SEP A003: HIGH SEP	(1) Input the stereo L signal (300Hz) from the TV audio multiplex signal generator to the antenna terminal. (2) Connect an oscilloscope to L OUT pin of the AUDIO OUT, and display one cycle portion of the 300Hz signal. (3) Change the connection of the oscilloscope to R OUT pin of the AUDIO OUT, and enlarge the voltage axis. (4) Enter Digital Service [1. Adjust]. (5) Select the <A002> (LOW SEP). (6) Set the initial setting value of the <A002> (LOW SEP). (7) Adjust the <A002> so that the stroke element of the 300Hz signal will become minimum. (8) Press the [MUTING] key to memorize the set value. (9) Input the stereo R signal (3kHz) and change the connection of the oscilloscope to L OUT pin of the AUDIO OUT. (10) Similarly adjust <A003> (HIGH SEP). (11) Press the [MUTING] key to memorize the set value.



SECTION 5 TROUBLESHOOTING

5.1 SELF CHECK FEATURE

5.1.1 OUTLINE

This unit comes with the "Self check" feature, which checks the operational state of the circuit and displays/saves it during failure. Diagnosis is performed when power is turned on, and information input to the main microcomputer is monitored at all time. Failure detection is based on input state of I²C bus and the various control lines connected to the main microcomputer.

5.1.2 HOW TO ENTER THE SELF CHECK MODE

- (1) Set to "0 minutes" using the [SLEEP TIMER] key.
- (2) While "0 minutes" is displayed, press the [VIDEO STATUS] key and [DISPLAY] key simultaneously, then enter the SERVICE MODE.
- (3) Press the [4] key (4.Diagnostics) in the SERVICE MENU SCREEN. (Fig.1)
- (4) Press the [3] key (3.Self check) in the DIAGNOSTICS MODE screen. (Fig.2)
- (5) The SELF CHECK MODE screen is displayed. (Fig.3)
- (6) Press the [VOL+] / [VOL-] key to switch between the first page and the second page.

NOTE:

When a number key other than the [4] key is pressed in the SERVICE MENU SCREEN, the other relevant screen may be displayed.

This is not used in the SELF CHECK MODE. Press the [BACK] key to return to the SERVICE MENU SCREEN.

5.1.3 HOW TO EXIT THE SELF CHECK MODE

TO SAVE FAILURE HISTORY:

Turn off the power by unplugging the AC power cord plug when in the SELF CHECK MODE.

TO CLEAR (RESET) FAILURE HISTORY:

Turn off the power by pressing the key on the remote control unit when in the SELF CHECK MODE.

5.1.4 FAILURE HISTORY

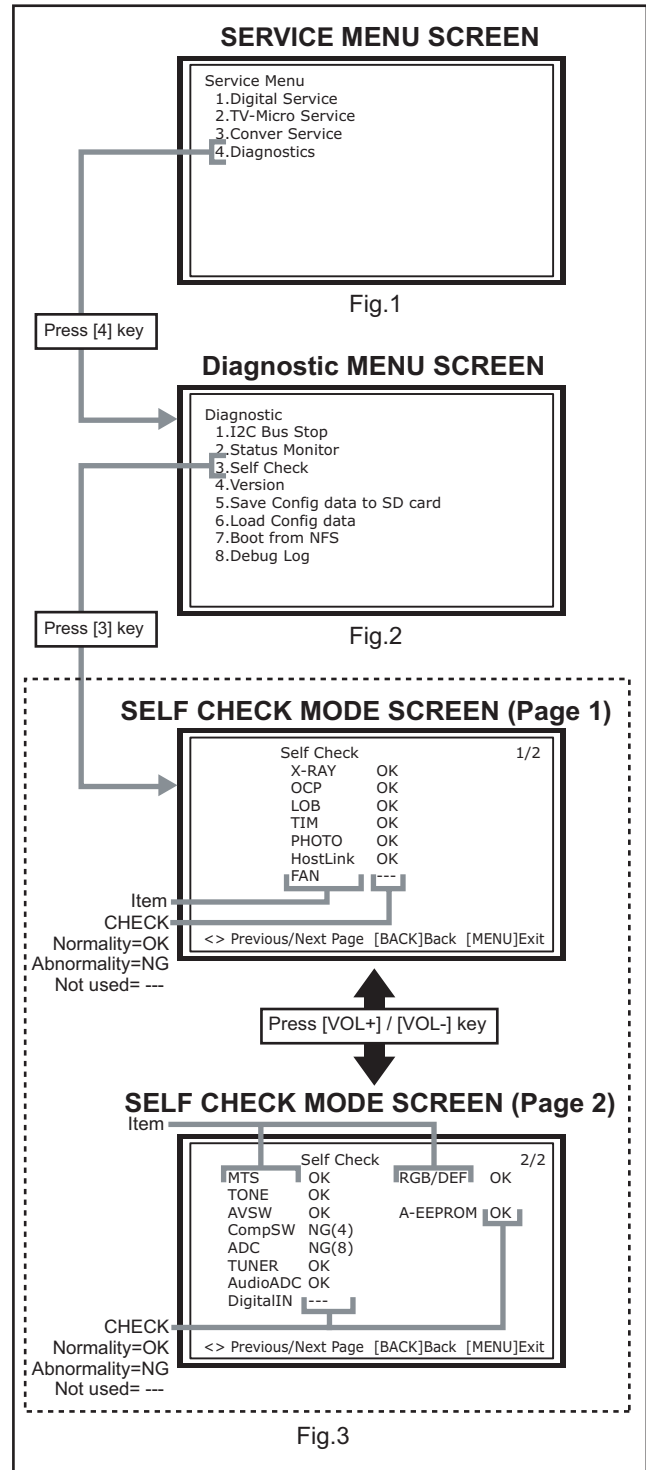
Failure history can be counted up to 9 times for each item. When the number exceeds 9, display will remain as 9. Failure history will be stored in the memory unless it has been deleted.

5.1.5 POINTS TO NOTE WHEN USING THE SELF CHECK FEATURE

In addition to circuit failures (abnormal operation), the following cases may also be diagnosed as "Abnormal" and displayed and counted as "NG".

- (1) Temporary defective transmissions across circuits due to pulse interruptions
- (2) Misalignment in the on/off timing of power for I²C bus (VCC) when turning on/off the main power.

Diagnosis may be impeded if a large number of items are displayed as "NG". As such, start Self check check only after 3 seconds in the case of receivers and 5 seconds in the case of panels upon turning on the power. If recurrences are expected, ensure to clear (reset) the failure history and record the new diagnostic results.



5.1.6 DETAILS

Self check is performed for the following items:

5.1.6.1 PAGE 1 OF SCREEN

Detection item	Display	Detection content	Diagnosis signal (line)	Detection timing
X-ray protection	X-RAY	Operation of X-ray protection circuit. Q710 [MAIN PWB]	X_RAY	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected during 200ms, the POWER LED is blinked.
B1 over-current protection	OCP	B1 over-current is detected. Q971 [DEF & CONVERGENCE OUT PWB]	OCP	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected during 200ms, the power is turned off automatically.
Low bias line short protection	LOB	Operation of low B short protection circuit. 5V: Q961 9V: Q962 [MAIN PWB]	LOB_PRO	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected during 400ms, the power is turned off automatically.
Timer (clock)	TIM	The power frequency is changed as follows: 50Hz → 60Hz / 60Hz→50Hz. IC701 [MAIN PWB]	AC_IN	Detection starts 3 seconds after the power is turned on. Periodically check the power frequency by counting the AC pulse and monitor whether or not the frequency is changed.
Photo detect	PHOTO	Operation of the photo sensor.	DIGI_PHOT	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected during 400ms, irregularly is counted.
DTVM and TVM communication	Hostlink	Communication error between the digital TV microcomputer and the TV microcomputer is detected. IC701 [MAIN PWB]	SDA	Check communication errors by counting the number of reset exception handling.
Fan lock	FAN	Not used.	---	---

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Detection item	Display	Detection content	Diagnosis signal (line)	Detection timing
US audio multiplexing decoder	MTS	Confirmation of reply of ACK signal which uses I2C communication.	SDA	If it checks whenever I2C communication is performed and no reply of ACK signal an error will be counted.
Tone/volume control	TONE	Same as above.	SDA	Same as above.
AV select switch	AVSW	Same as above.	SDA	Same as above.
Component signal select switch	CompSW	Same as above.	SDA	Same as above.
A-D converter for component signal	ADC	Same as above.	SDA	Same as above.
Tuner	TUNER	Same as above.	SDA	Same as above.
A-D converter for audio	Audio ADC	Same as above.	SDA	Same as above.
Digital input	DigitalIN	Not used.	---	---
RGB/Def process	RGB/DEF	Confirmation of reply of ACK signal which uses I2C communication. IC301 [MAIN PWB]	SDA	If it checks whenever I2C communication is performed and no reply of ACK signal an error will be counted.
Memory	A-EEPROM	Confirmation of reply of ACK signal which uses I2C communication. IC702 [MAIN PWB]	SDA	Same as above.

5.1.7 DISPLAY METHOD WHEN RASTER IS NOT AVAILABLE

The self check results are shown on the following POWER LED display. When the raster is not displayed, each failure is shown by turning LED on and off at the specified intervals.

- For B1 over-current protection and Low B short protection, the power of the TV is turned off when NG is detected. Immediately after the power is turned off, the POWER LED will be turning on and off. When the power is turned off, you cannot turn the power on again until the AC plug is taken out and put in again.

Item	POWER LED ON / OFF intervals
X-ray protection	Turning on and off at 0.1-second intervals
B1 over-current protection	Turning on and off at 1-second intervals
Low B short protection	Turning on and off at 2-second intervals



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